FOOD MANUFACTURE

Incorporating Food Industries Weekly

ARD HILL LIMITED. STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 JULY 1, 1953

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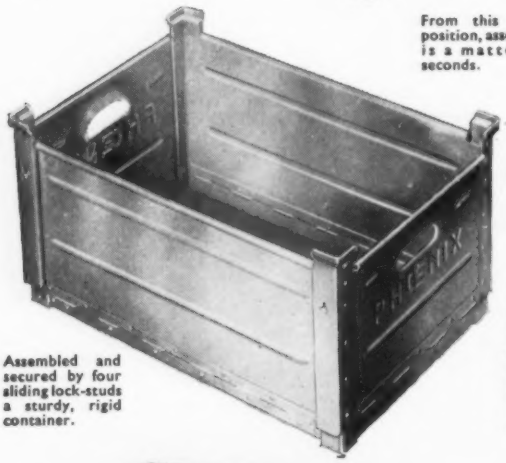

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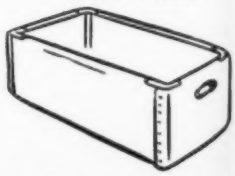

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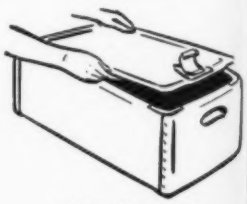

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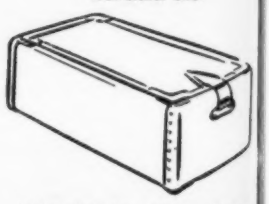

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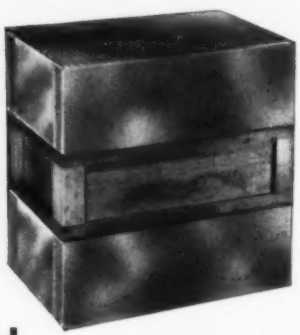

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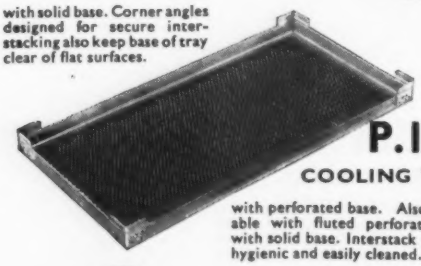
for biscuits or other commodities, is shown above interstacked with wood box.



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FOOD MANUFACTURE

Vol. XXVIII. No. 7 · Published Monthly · July 1, 1953

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FOOD MANUFACTURE

Vol. XXVIII, No. 7 July 1, 1953

British Raspberries for U.S. Jam

FOLLOWING the preliminary sales of a year ago, Tay Valley raspberry growers are to investigate the market for quick frozen raspberries in America. The American position, as reported by the British Embassy in Washington, is that supplies of top quality fruit for jam making fall short of requirements. If British growers can quote competitive prices there seems to be a sound prospect of sales, especially since Scottish raspberries are regarded as being the finest in the world, when properly handled.

This aspect of handling was stressed by Mr. Graham Smedley who said that, judging from personal experience, berries should be complete, without stalk or leaves, and with no water; picking as practised at present would not do for the American market.

The Tay Valley N.F.U. branch has agreed to appoint a committee to investigate the scope of sales to America on the basis of last year's quotation of 29 to 30 cents per pound. Allowing for transport cost at around £65 per ton on quick frozen fruit, the American quotation should give a return of £160 per ton or thereabouts.

Staling of Coffee

THE cause of the development of stale or rancid flavours in roasted coffee after a few days' contact with air is not clearly understood although the obvious inference is that the changes are oxidative in kind. Roasted coffee contains quite a high percentage of fat, some 10 to 14 per cent. One popular theory is that the staling of ground roast coffee is due to the development of fat rancidity, but detailed investigations have not given much support to this. A more tenable idea is that staleness is caused by changes in the actual flavour-giving constituents of coffee, changes that include polymerisation and hydrolysis as well as oxidation. It may be, however, that the coffee fat acts as the carrier of oxygen for the changes that involve oxidation.

A further attempt to solve this difficult problem has recently been reported from India. M. R. Chandrasekhara and B. T. Narayanan of the Central Food Technological Institute, Mysore, kept freshly roasted and ground coffee in contact with air for 10 days and for two months and also kept another portion in vacuum for four months. At the end of these periods the coffee fat was extracted from all the samples. In each case it was free from peroxides, although both lots of coffee which had been exposed to air had developed staleness and loss of aroma. The fat samples, whether from air- or vacuum-stored coffee, behaved similarly on subsequent exposure to air, developing some rancidity after three days, and thereafter becoming more and more rancid. But while present in the non-extracted coffee, the fat had not developed rancidity whether or not in contact with air. It is again made clear, therefore, that coffee fat by itself is not responsible for coffee staling. Other constituents in coffee must be fundamentally responsible.

The Miller and the Future

SOME of the problems to be faced by millers when the 14 years of strict control came to an end were discussed in an address by Dr. D. W. Kent-Jones at the annual general meeting of the Southern Counties Flour Millers' Association.

During the period of control—the longest spell of restriction that had ever previously been known in the history of the industry—millers had been looked after in many ways and had not been compelled to face the problems that would shortly have to be tackled. As an example, Dr. Kent-Jones pointed out that millers had not been able to use their pre-war skill and knowledge in wheat buying, they had not had to face the same competition, and they had had to mill fixed grists to a fixed extraction.

Dr. Kent-Jones remarked that he was a little nervous about the readiness of millers to get into their stride straight away. Conditions would not be exactly the same as those prevailing before the war. Apart from the difficult question of nutrients and fortification, standards of hygiene differing widely from those prevailing in pre-war days would have to be maintained.

Another problem to be faced in the near future was that of prescribed nutritional standards. The authorities had decided that certain vitamins in specific amounts were important items in the diet of

the country. Millers would have to conform to these standards and it was probable that the matter would not stop there.

On the subject of enrichment, Dr. Kent-Jones said that the problem of adding comparatively minute quantities of B_1, nicotinic acid, and iron to flour was giving trouble to some millers. However, a relatively simple system had been worked out in the form of a master mix. This would mean an extra cost for materials of something like 5d. to 6d. per sack; in addition, there would be the cost of the necessary extra plant and of analysis of samples.

Sample testing would not be quite the same matter as formerly, nor would it be done so cheaply; 0·2 mg. per 100 g. of vitamin B_1 was merely a trace, and the testing of nicotinic acid in the prescribed amount was no easy matter.

On the question of bleaching, Dr. Kent-Jones spoke of the physical method of ageing flour by the Batter process. In his opinion, the matter of flour treatment was better left in the hands of the miller and, in any case, physical treatment would never beat chemical treatment—at least while chemicals remained in use.

Dermatitis and Celery

A SERIOUS economic problem has been presented in Massachusetts by outbreaks of dermatitis caused by Pascal green summer celery. Until the introduction of this variety in 1935, there had been no record of any untoward effects arising from the handling of celery. Since 1939, however, when its culture spread by reason of its superior texture and flavour, large numbers of farm workers have been affected by a dermatitis which, at times, has become incapacitating.

Because no previous conclusive scientific evidence had been given concerning the ingredient responsible for the disease, Joseph E. Palumbo and E. V. Lynn, of the Massachusetts College of Pharmacy, have made a study of the problem with the isolation of the injurious ingredients as the chief objective.

Reports in the literature had indicated that the dermatitis was caused by volatile oil which is known to be present in various parts of the stalk and in the lamina of the leaf. Since the fresh material yielded too small a quantity of oil for convenient handling, it was necessary to dry about 10 kg. for the preparation of 1 ml. of the oil.

Alcoholic and ethereal extracts of the fresh, air-dried, and rotted material were used in patch tests, together with the pure oil on six celery workers who had previously been afflicted with the dermatitis.

As a result of these tests (*J. of the Amer. Pharm. Assoc.*, **42**, 1, 58) one of the celery workers failed to give reactions; he was believed to have reached a stage of hyposensitisation. The others, however, displayed reactions varying from redness to "angry" patches with tiny vesicles. Because the celery oil gave a positive test in 67 per cent. of the tests, it was concluded that it was definitely the causative agent of the dermatitis.

The pure oil that has been isolated from the celery plant is being used in attempts to reduce the incidence of dermatitis in farm workers who showed positive reactions to the test. Whether this attempt at hyposensitisation will be successful will not be known until another growing season has passed.

Quick Frozen Bread

THAT the days of stale or wasted bread are numbered is the conviction of a large New York bakery company who plan to freeze their output of bread, distribute it in refrigerated vans, and arrange for it to be cold-stored at distribution points over a wide area in the United States. Costs, it is claimed, will be reduced rather than increased, because bakers will no longer need to work overtime or during holidays, and overhead charges will be lessened when it is realised that more than a day's supply can be bought at a time.

It is said that slices of frozen bread can be toasted without previous thawing, and for use as fresh bread thawing at room temperature is satisfactory. One bit of sales talk is that a week's requirements of frozen bread could be stored in a domestic refrigerator. This may savour of attempting to put a quart into a pint pot, or has the American housewife such an excess of space available?

The claim that the loaf retains its original fresh flavour and texture several days after baking is an attractive one. How far it can be justified in practice will soon be shown by this new American venture. If it is successful, a revolution in the baking industry may well be on the way.

Cornish Pilchards

THE petition presented by Cornish fishermen protesting that the import of canned pilchards from South Africa was spelling the ruin of the Cornish pilchard canning and fishing industry has drawn a reply from the Minister of Agriculture and Fisheries, who says:

"So far as the fishing industry is concerned, figures of landings and values indicate that 1952 was the most successful pilchard season since the end of the war. It is true that pilchard drifting has fallen off in recent weeks, but until a year or so ago it was unusual for pilchards to be caught for canning between January and May, when the quality of most of the fish is poor and unsuitable for that trade, and at that time of the year most of the boats turned over to long-lining. It seems to be reasonable to

assume that the canners should, during the next month or so, be able to dispose of sufficient of their present stocks of pilchards to enable them to enter the market again for the 1953 catch."

The Minister then goes on to advise the fishermen not to rely on the canners as the sole outlet for their fish, but to offer pilchards for curing as well, adding that the White Fish Authority has decided to erect a fish meal factory in the south-west which should help the fishermen by taking any pilchards surplus to the requirements of other markets.

Although the curers would be unable to buy at the price offered by canners last year, they should be able to pay a price which, with the addition of the subsidy of 10d. a stone, would be sufficient to give the fishermen a fair return.

Human Factors in Industry

Two committees to work on human problems in industry have been set up jointly by the Department of Scientific and Industrial Research and the Medical Research Council. One will deal with human factors in individual efficiency and the other with human relations. Broadly, the division of interest between them is that the first will study the individual worker and his job and the second such things as the relation between the manager and the worker, between the worker and his mates, and between the foreman and the technical specialist.

The subjects which will concern the two committees can be listed under four headings. Firstly, work on the design of tools and working equipment to suit the man who uses them, and the effect of factory lighting, heating, and noise on performance, both of which are concerned with fitting the job to the man. Secondly, is his selection and training. Thirdly, there is assessing the job, which is concerned with work measurement, job appraisal, and time and motion study. Fourthly, there is included under the general subject of human behaviour and relations, such matters as joint consultation, attitude to work, and the structure of informal groups in the factory.

For research on matters relating to occupational health, the Medical Research Council will continue to be responsible, advised by its own special committees. However, in order to secure co-operation on technical aspects the D.S.I.R. will be asked to appoint assessors to these committees where appropriate. For example, the elimination of dust from factories, although primarily a medical problem, may bring in the D.S.I.R. or the Research Associations to develop means of combating it.

The importance of taking full account of scientific study of the human factors in industry is becoming more widely appreciated. Much knowledge of the subject is already available, but not nearly enough.

The aim of the Committee's work will be to develop knowledge which can be used to make hard and fast recommendations. Thus it will help a firm which is (say) introducing a new process or new equipment to get it working smoothly in the shortest possible time and with the fullest co-operation between everyone concerned. The underlying object is to apply the results of the work to improve production. For this reason, the Committees include persons from industry, trades unions, and universities.

Citrus Products and By-products

CITRUS fruit processing is of comparatively recent date. It started in Italy with the recovery of oil from the rind. The American citrus fruits industry, now the largest in the world, was started in 1899. Palestine, with amazingly rapid expansion, has moved up to second place.

The successful marketing of any seasonal and perishable foodstuff depends upon surplus exploitation. If there exist adequate canning or cold-storing facilities, or factories to absorb the surplus and convert it into non-perishable products, the returns from primary sales are not subject to deductions for wastage, nor do years of bumper crops bring economic misery for growers.

The absence of adequate means to deal with crop surpluses is well enough known to the British plum industry. By contrast, the California Fruit Growers' Exchange—first founded in 1893 and now handling 75 per cent. of the fresh citrus fruit shipments in California—actually sold 29 per cent. of the 1951-52 season fruit for processing.

A valuable and well documented survey of these processing activities has recently appeared. (*Ind. and Eng. Chem.*, **45**, 5, 876-890.)

Juice itself remains one of the major products. Its fate after extraction varies; it has firm markets in canned, concentrated, and frozen-concentrated forms, and huge quantities are required by the soft drinks industry. Frozen concentrated juice is a most notable modern development; in 1947, U.S. production was 2,300 gallons, but by 1952 this figure had risen to 47,000,000 gallons. Essential oils from the outer rind have also maintained their importance.

Cattle-meal is the main outlet for the fruit residues after juice and oil extraction, but in recent years pectin production, for both the food and pharmaceutical industries, has steadily expanded. Peel hydrolysis under varying conditions yields several different kinds of pectin. Hesperidin, a vitamin P material, is also being increasingly produced by a comparatively simple process.

Two manufacturing problems have exerted criti-

cal influences upon all this development. One has been the selection of metal for plant construction, and it is scarcely an exaggeration to say that the development of stainless steel has made possible the large scale processing of citrus fruit. The other is the disposal of waste waters. The biggest Californian factory has to dispose of about 1,400 tons of waste waters per day. Shallow irrigation on a 240 acres farm has eliminated the nuisance of flies and undesirable odours, and the farmland, on the old rotation principles of a sewage farm, produces cereal crops.

Cashew Nut Harvest

FROM Tanganyika, home of lost causes so far as one nut harvest is concerned, comes brighter news. The Cashew Growers' Association reports a record crop of 10,000 tons of cashew nuts worth half a million pounds for 1952. Cashew nuts, common enough as salted nuts, grow in a peculiar way. *Anarcardium Occidentale*, a tree indigenous to American tropical regions, is deemed "polygamous" by the botanist. Strange indeed is the useless pear-shaped fleshy fruit and distended stalk, much larger than the kernel attached to the lower end of the bulbous mass. This strange suspension is accompanied by an equally strange kernel; a double-walled affair with a brown blistering oil between the two walls, an oil used at various times as an insecticide, in varnishes, and even as a lubricant. Primitive methods of preparation by natives consisted of roasting the whole kernel, which burst the shells, liberating jets of oil which caught fire to produce irritating fumes. Then came improved roasting in iron cylinders, the oil being drained and collected before the inner shells were broken open to yield the main product.

The growth of the industry in Tanganyika has been remarkable. The story of the early introduction of the cashew nut into East Africa dates back to the 15th century, when Portuguese missionaries took it there and to India from its American habitat, the nut thriving in coastal areas and moderate altitudes. Where export is concerned, the cashew industry is really only 30 years old; for only in 1923 was the solution found to the problem of losses caused by weevils during transit. In order to avoid shipping losses, American producers introduced hermetically sealed containers, with the contained air replaced by carbon dioxide. Transport has been facilitated by the use of communications built by the Overseas Food Corporation, now that *Anarcardium Occidentale* seems to have ousted *Arachis Hypogoea*. By 1940 the United States produced nearly 34 million pounds of these nuts, the industry also utilising the cashew wood for crates, the oil for the purposes mentioned above, and a gum for varnishes.

Story of a Stomach

OF all remarkable stories associated with digestion, that of the American surgeon and his patient "with a lid on his stomach" is surely the strangest. The centenary of William Beaumont's death brings to mind this authentic chapter in which direct observations on digestion in man rather than in animals became possible, when in 1822 a young Canadian was accidentally shot. A hole was left in the stomach of this youth, Alexis St. Martin, one which was later closed with a valve or lid of abdominal lining and which enabled direct observation of digestion reactions.

Beaumont himself was a striking character before this historic series of experiments brought him fame. He was no American college medical student, having only his apprenticeship to a doctor as his training. He swept the office, kept up the fires, learned prescriptions, rode long hours with his boss—and studied patients' symptoms. Such was the training of an American army surgeon who operated continuously for 48 hours after the battle of York, when the retreating English had exploded 300 barrels of gunpowder under the feet of the advancing Americans.

This was but a prelude to Beaumont's greater achievement after young St. Martin suffered the injury and it was found that the stomach wall could not be returned completely to the abdominal cavity. Although Beaumont was in a poor financial position, he saved the young Canadian from being sent to a poor law institution and in turn was provided with a case unsurpassed in interest.

The use of the natural lid or valve closure instead of a lint pad was so successful that, following his convalescence, young St. Martin was able to chop wood and assume an active life of sorts. Meanwhile Beaumont began his scientific studies of digestion, noting temperatures of the stomach during the process, movements of walls, the relative digestibility of foods, and observing that samples of digestive juice removed and put in test bottles still did their work, only more slowly.

Contrary to the beliefs of Prout, Lehmann, and others, all of whom refused to entertain the idea of hydrochloric acid being formed in the stomach, Beaumont proved that this acid was essential. It is surprising to hear that Beaumont obtained no help from such chemists as Berzelius of Stockholm and Silliman of Yale in the analyses of gastric juices. Yet he succeeded in overthrowing a number of prevalent theories on digestion and on the role of the stomach, hitherto believed to be a reservoir, a "fermentation vat," or a grinding or triturating apparatus. Beaumont lived to the age of 63; his patient with the remarkable stomach lived to celebrate his eighty-third birthday!

Irish Meat and Vegetable Canning

The Irish canning industry has only recently become a factor in the world's export market, but within the past 10 years it has grown rapidly and today there are 12 factories devoted to canning in Dublin alone, while throughout the country many more are being built.

AN important Irish group is Canned Products, Ltd., Dublin, which first started production in 1950, and in the past 18 months has produced over 9,500,000 lb. of finished processed foods for the export markets of Britain and America. Apart from canning, the company exports frozen manufacturing beef to America.

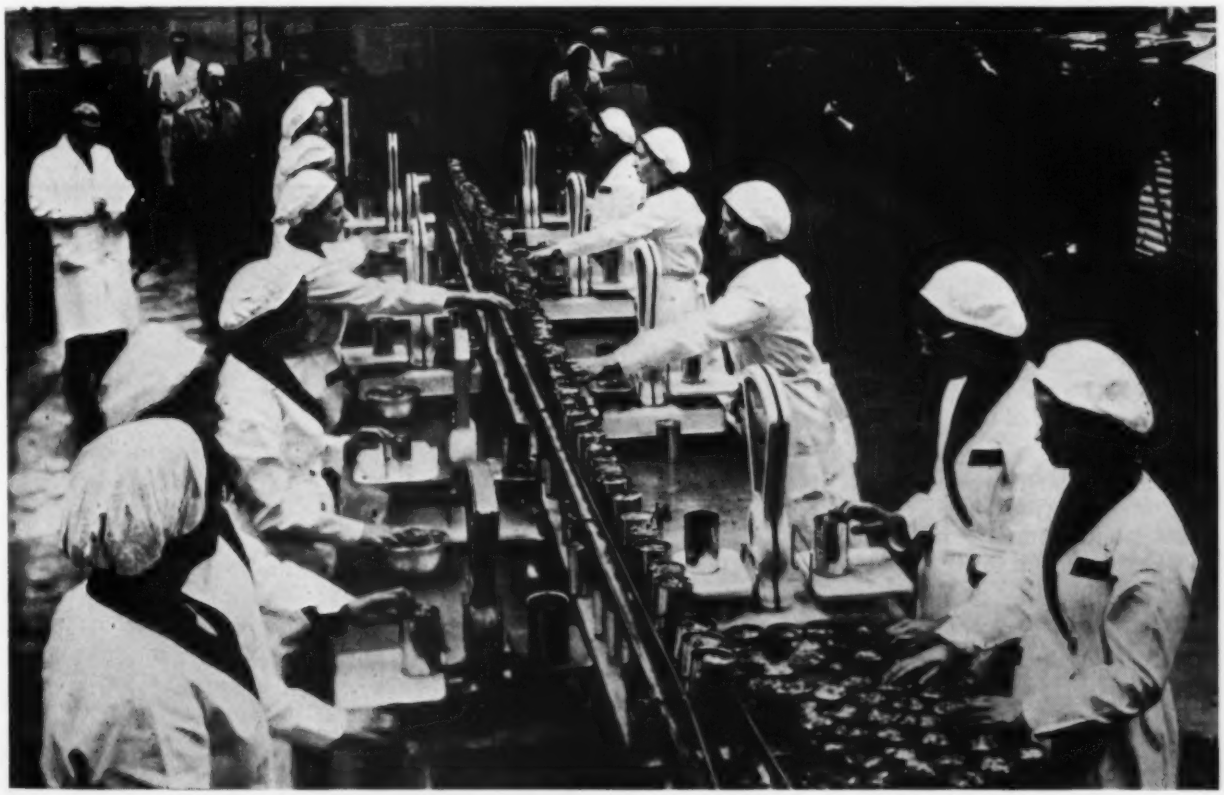
This year the company has placed over a dozen different lines of foodstuffs on the market. The export trade amounts to about 700 head of cattle per week, for a 12 weeks' season or roughly 8,000 in all, the buying organisation operating from the Dublin abattoir. Buyers attend the Dublin cattle market and also go to fairs and markets all over the country to purchase prime quality beasts. This increases the exports to America and Britain, so helping to reduce the country's adverse trade balance. It also provides a valuable impetus to the Irish dairy cattle trade; by buying the farmer's dairy cattle before or just as they have reached their peak period of yield, the company helps the farmer to replace the cattle by others that have a higher milk yield. The Government's policy is to encourage farmers to improve their dairy herds this way.

Beef for American Food Products

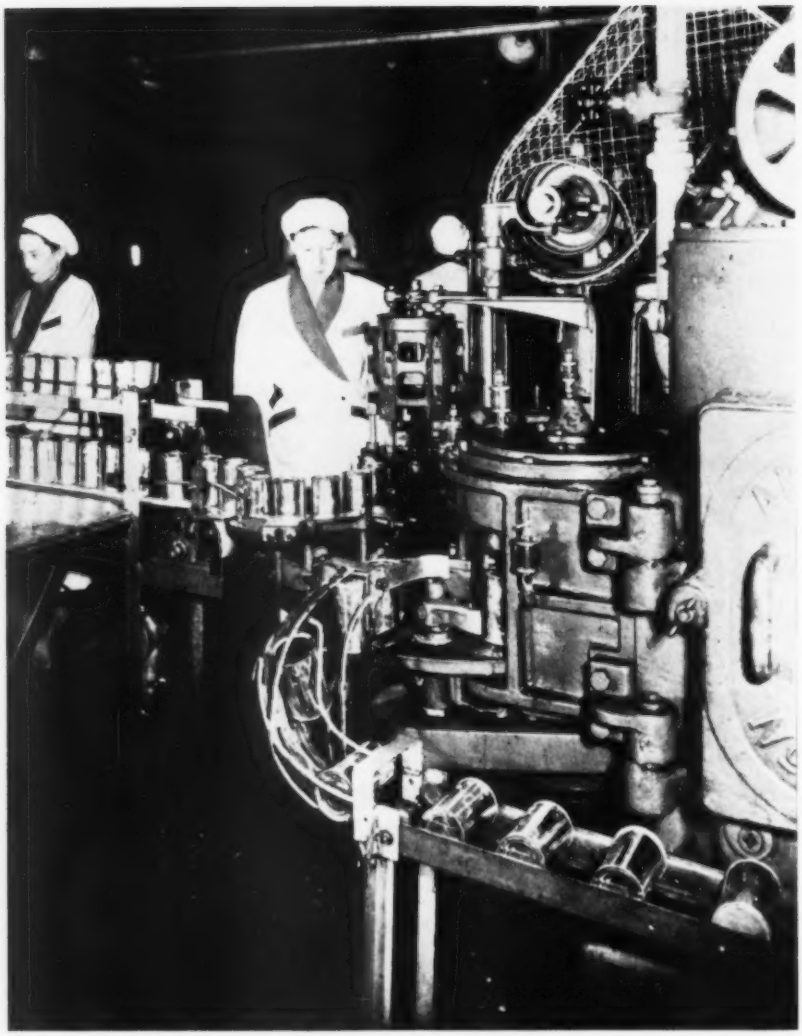
Frozen beef sent to America is used in the manufacture of soups and in processed foods. One of the largest U.S. customers for this Irish beef is Campbells, the soup firm. This trade has now reached such proportions as to create difficulty in obtaining the requisite shipping space. International Packers of Chicago specially chartered a ship to take a cargo of frozen beef consigned from Dublin to New York and Philadelphia.

Stewed Steak for Britain

Britain is chiefly interested in importing canned beef to supply the demand for stewed steak. Every effort has been made to meet this requirement. U.K. and U.S.A. export markets are largely complementary, for in the Cork Street factory the meat is divided into two classes suited to them. The competition in the export market makes highly efficient production very necessary. The company has invested large sums in modern machinery and plant to attain a high degree of mechanisation. Despite this, 150 to 200 men and women are employed in the busy season, when about 100 tons of raw meat are handled weekly. Factory organisation is



Cans of stewed steak are weighed as they pass along the conveyor belt.



Four-head fully automatic vacuum seamer closes 150 cans per minute.

under the control of Mr. Greensmith, who is Production and Technical Director. He was engaged in tropical fruit research in West Africa and continued his technical studies in Scandinavia. When he went to Ireland in 1935 he acted as a pioneer in the fruit and canning industry.

Canned Stewed Steak

From the wide range of products manufactured, the canning of stewed steak has been selected for description. The canning line at the Cork Street factory is considered the most modern and efficient in Europe.

After leaving the Dublin abattoir, where the beasts are killed and quartered, the beef is brought to the factory where special cuts are packed, in wax paper and wooden cases, for export to the U.S. These cases are then placed in deep freezing chambers at 25° below zero.

The meat destined for canning is trimmed, passed through cutting machines, handling four tons per hour, and fed by vacuum fillers into the cans. Moving along a conveyor belt, the cans as they pass are weighed by girl operatives. Arriving at the other end of the factory, they are clinched and vacuum seamed. Each of the machines used has an output of 40,000 one pound cans per eight hour shift. Every can is dated and the batch number marked with a code to facilitate tracing if necessary. The cans are then washed and enter the retorts.

After cooling, the labelling and packing operations complete the manufacturing cycle. An elevator takes them to the storeroom, where they remain for 14 days' incubation, after which they are loaded on to lorries and taken to the docks, or to the local shops.

Other Canned Products

The company also cans fruit, vegetables, and soups. A recent development has been the acquisition of a 300 acres estate at Portmarnock, just outside Dublin,

Cans of stewed steak being loaded into retorts for processing.

Each line of labelling machines operates 100 cans per minute.

where it is planned to grow some of the vegetables required for canning.

The output from the bean canning line is 50,000 to 60,000 cans per day and the output of processed peas is similar. The beans and peas are grown under contract by farmers within a radius of 20 miles of the city. The seed is chosen by the company's experts, particular attention being paid to the best types for packing, and for those which retain colour. On the Portmarnock Estate the vegetables are cleaned before being sent to the factory.

The output of canned soups is 30,000 cans per day. Among the recent additions to the assortment are Cream of Mushroom and Cream of Chicken soups. Fresh cream is supplied by Dublin Dairies, Limited, whose lorries provide a rapid service.

Strawberries and raspberries are grown in the neighbourhood of Dublin and to meet the needs of those who cannot eat the ordinary fruit, packs specially prepared for diabetics have been put on the market.

An annual supply of 12 million cans, imported from Britain, is used.

An interesting innovation has been the "Tasting Parties" at which housewives and others are invited by the company to sample the soups and test for themselves their taste and quality. Regarded by the firm as the quickest and fairest way of demonstrating the high quality of the goods, these tasting parties are to be extended to Cork, Waterford, Sligo, Dundalk, and elsewhere.

From July to March, the production season for frozen and canned meat, approximately 20,000 cattle are handled. The frozen beef output is about two tons of boneless cuts per day and the output of stewed steak for Great Britain is 40,000 × 1 lb. cans per eight hour shift.

Canned Products concentrate principally on soups, vegetables, and fruit, and meat roll for the home market.

Ireland's Canning Industry

The policy of the firm is fast, efficient production, wide sales, and low profits. This, the directors consider, leads to an expanding business, wider employment, and lower prices for export consignments and for canned goods on the home market.

Generally the Irish canning industry is immeasurably better off than it was 20 years ago. Government help has enabled it to take advantage of a situation where many millions of people are hungry in a world whose population continues to expand, but whose production of food lags far behind the demand. By diverting Irish agriculture's production of animals and crops to factories for export in processed form rather than in a raw state, Ireland hopes to gain a more valuable and lasting return.

If industrial development were neglected at the expense of agriculture, the belief is that an opportunity would be missed for establishing Irish products and it is thought that this chance might never arise again.

SUPPLIERS OF EQUIPMENT

Seaming machines: *Angelus Sanitary Can Machine Co.; Premier Filterpress Co.; The Metal Box Co.*
Retorts: *John Fraser and Son; G.C. Engineering Co.*
Runways: *The Metal Box Co.*
Boilers: *Cochran and Co. (Annan).*
Stainless steel pans: *Groen Co.*
Exhaust boxes and elevators: *G.C. Engineering Co.*
Compressors: *Ingersoll Rand.*
Refrigeration: *Frigidaire.*
Mixers: *Peerless and Ericsson.*
Mincers: *Alexanderwerk.*
Scales: *Berkel Auto-Scale Co.*

The Leonard Hill Technical Group

Articles published in some of our associate journals in the Leonard Hill Technical Group this month include:

Manufacturing Chemist.—Chemotherapy and Selective Toxicity; Odour Research, Part II; Terramycin Production in England.

Chemical & Process Engineering.—Demineralisation of Salt Waters, Part II; Reconstruction of Beer Conditioning and Cooling Plant; Gas Engineering in the U.S.A.

Building Digest.—Lakewood Park Development Scheme.

Muck Shifter.—The Place of Cranes in Muck Shifting.

Petroleum.—Lubricants for Engines and Industrial Equipment; Synthetic Gas Turbine Lubricants; The Effect of Oil upon American Industry.

Atomics.—A Survey of Nuclear Instruments.

Fibres (Natural and Synthetic).—Pulverising Machinery; New Zealand's Flax Industry.

World Crops.—New Zealand Farming; Green Manuring in India and Pakistan; Land Developments in Iraq; Witch's Broom Disease of Cacao.

Ministry of Food

LATEST STATUTORY INSTRUMENTS

The list given below is the continuation of the list of Instruments published in "Food Manufacture," February 1, 1953, page 52.

No.	Date. 1953.	
		PRICE FIXATION
30	Jan. 25.	Order amending the Rice Order, 1950.
245	Mar. 1.	The Canned Corned Meat (Prices) Order, 1953. Revokes S.I. 1952, No. 2257.
284	,, 1.	The Bacon Order, 1953. Revokes S.I. 1952, No. 1716.
427	,, 22.	Order amending the Sugar (Prices) Order, 1952.
494	Apr. 1.	The Feedingstuffs (Prices) Order, 1953. Revokes S.I. 1952, Nos. 1203, 1591, and 2083.
532	,, 1.	Order amending the Barley Order, 1952.
533	,, 1.	Order amending the Dredge Corn (Great Britain) Order, 1951, and the Dredge Corn (Northern Ireland) Order, 1951.
534	,, 1.	Order amending the Oats (Great Britain) Order, 1952, and the Oats (Northern Ireland) Order, 1952.
582	,, 5.	Order amending the Flour Order, 1952.
726	May 1.	The Milk (Great Britain) Order, 1953. Revokes S.I. 1951, Nos. 1157 and 2311; S.I. 1952, Nos. 1239, 1588, and 2020; S.I. 1953, No. 551.
727	,, 1.	The Milk (Northern Ireland) Order, 1953. Revokes S.I. 1951, Nos. 739, 1158; S.I. 1952, No. 1238.
815	,, 17.	The Canned Corned Meat (Prices) (No. 2) Order, 1953. Revokes S.I. 1953, No. 245.
		CANNING
23	Jan. 16.	Order revoking the Canning of Food and Feedingstuffs (Control) Order, 1942, and the Home-canned Fruit and Vegetables Order, 1950.
		CEREAL FILLERS
520	Apr. 1.	Order revoking the Cereal Fillers Order, 1951.
		EGGS
529	Mar. 26.	The Eggs Order, 1953. Revokes S.I. 1951, Nos. 2143 and 2144; 1952, Nos. 339, 1135, and 1818.
		EGG PRODUCTS
731	May 1.	Order revoking the Egg Products (Control and Maximum Prices) Order, 1946.
		FEEDINGSTUFFS
2265	Jan. 1.	Order amending the Feedingstuffs (Rationing) Order, 1952.
		ICE CREAM
828	June 1.	The Food Standards (Ice Cream) Order, 1953. Revokes S.I. 1951, No. 13; 1952, No. 1283.
		LABELLING
536	Apr. 5.	The Labelling of Food Order, 1953. Revokes S.I. 1950, No. 1061; 1952, No. 549.
		LICENSING
791	May 17.	Order revoking the Biscuits (Licensing) Order, 1951.
		MEAT PRODUCTS
246	Mar. 1.	The Offals in Meat Products Order, 1953.
		MILK
551	Apr. 1.	Order amending the Milk (Control and Maximum Prices) (Great Britain) Order, 1951.
552	,, 1.	Order revoking the Cream Order, 1951, the Use of Milk (Restriction) Order, 1945, and the Use of Milk (Suspension of Restriction) Order, 1951.
614	May 1.	The Milk (Special Designations) (Specified Areas) Order, 1953.
615	,, 1.	The Milk (Special Designations) (Specified Areas) (Scotland) Order, 1953.
		OILS AND FATS
210	Feb. 15.	The Oils and Fats Order, 1953. Revokes S.I. 1952, Nos. 327 and 1773.
		POTATOES
2217	Dec. 29. 1952.	Order amending the Seed Potatoes Order, 1952.
		PRESERVES
691	Sept. 1.	The Food Standards (Preserves) Order, 1953. Revokes S.R. & O., 1944, No. 842; 1946, Nos. 157 and 1221; S.I. 1949, No. 1893; 1950, Nos. 1056 and 1871.
		RATIONING
2039	Nov. 30. 1952.	Order amending the Meat (Rationing) Order, 1952. Revokes S.I. 1952, No. 1659.
74	Jan. 25.	Order amending the Bacon (Rationing) Order, 1952.
75	,, 25.	Order amending the Meat (Rationing) Order, 1952. Revokes S.I. 1952, No. 2039.
145	Feb. 5.	Order revoking the Rationing (Personal Points) Order, 1952.
211	,, 15.	Order amending the Fats and Cheese (Rationing) Order, 1952.
233	,, 22.	Order amending the Bacon (Rationing) Order, 1952.
544	Apr. 1.	Order amending the Feedingstuffs (Rationing) Order, 1952.
639	,, 19.	Order amending the Sugar (Rationing) Order, 1952.
792	May 17.	The Food Rationing (General Provisions) Order, 1953. Revokes S.I. 1952, Nos. 971, 972, 913, 914, 1121, 1458, 1653, 1778, and 2038; S.I. 1953, Nos. 74, 75, 211, 233, and 639.
793	,, 17.	The Bacon (Rationing) Order, 1953.
794	,, 17.	The Fats and Cheese (Rationing) Order, 1953.
795	,, 17.	The Meat (Rationing) Order, 1953.
796	,, 17.	The Sugar (Rationing) Order, 1953.

The Action of Vitamins

It has long been known that the absence of vitamins from the diet causes the appearance of the corresponding deficiency diseases. Thus xerophthalmia and night blindness occur in the absence of vitamin A, scurvy in the absence of vitamin C, and rickets in the absence of vitamin D. Each vitamin may therefore be said to work in preventing a special set of abnormalities. Only in the last few years' work, however, have we begun to understand the biochemical mechanisms by means of which the vitamins achieve their dramatic effects. At a meeting of the Nutrition Society which was held recently at Sheffield, with Prof. Hans Krebs, F.R.S., as chairman, recent investigations in this field were comprehensively reviewed.

ALTHOUGH the vitamins have the common feature of being required in small amounts to maintain the health of man or animals, they differ widely in their chemical properties. Thus vitamin C is a simple substance closely related to glucose, whereas vitamin B_{12} has a massive molecule distinguished by the presence of cobalt and a cyanide group. Some vitamins, moreover, are soluble in water while others are soluble in fats. It could hardly be expected, therefore, that all the vitamins could exert their action by mechanisms working on exactly similar patterns.

Main Groups of Vitamins

At the present state of knowledge, however, it seems possible to divide most of the vitamins into two main groups. Firstly, we have the large group of water-soluble B vitamins. These vitamins are required by various micro-organisms no less than by man, which has greatly facilitated research on their biochemical significance. Intensive experiments with tubes of bacteria, which give results much more quickly and cheaply than is possible with cages of rats, have proved that almost all the members of this group can be assigned definite functions in enzyme systems. Secondly, we may group together the fat-soluble vitamins, A, D, E, and K, which are either not required by bacteria or are at least required less urgently. Their functions, in so far as they have been defined, seem much more diverse. Vitamin C, in spite of its being soluble in water, may perhaps be attached to this group.

The complicated chemical changes which are an essential feature of all forms of life are carried out mainly through the agency of enzymes. These organic catalysts, which once were known as ferments, are usually large molecules made up on a basis of protein. Most of them have the typical properties of being destroyed by strong heat and inactivated by certain poisons, such as the fluoride and cyanide ions. Conversely, their activity may be increased by other substances acting as "co-enzymes," and in many cases they have no activity at all without such assistance. The fact that aneurin and nicotinamide, two members of the vitamin B complex, are constituents of co-enzymes concerned in the metabolism of carbohydrates has been well known for many years.

Vitamins as Co-enzymes

At the conference more recent evidence of the role of other B vitamins was reviewed. Mr. D. E. Hughes spoke on the functions of co-enzyme A, which contains the vitamin pantothenic acid in combined form. This co-enzyme assists in transferring acyl groups, such as CH_3CO, from one molecule to another during metabolism.

Another co-enzyme, according to Dr. H. M. Sinclair, is derived from vitamin B_6 in the form of pyridoxal phosphate, which assists in the transfer of amino groups between molecules, in the decarboxylation of α-amino acids, and in the synthesis and degradation of the essential amino acid tryptophane.

Dr. J. W. G. Porter discussed the role of vitamin B_{12} in the transfer between molecules of one carbon fragments, such as methyl groups. He recalled that sheep subsisting on pastures poor in cobalt have long been known to suffer from a failure of growth called "pining." Pining has now been successfully treated with vitamin B_{12}, but the doses required are larger than might have been expected.

Vitamins as Reducing Agents

The most popular chemical method for estimating vitamin C depends on its strong reducing power, as measured by its ability to decolorise the dyestuff dichlorophenolindophenol. In early work on its distribution in animal tissues its presence was detected by treatment with silver salts, which were reduced to form a black deposit of silver. Dr. L. J. Harris discussed the role of this vitamin in metabolic processes, including the conversion of folic acid into folinic acid. Rapidly developing tissues require large amounts of vitamin C. In the guinea pig, which has continuously growing teeth, alternative periods of adequacy and deficiency in the vitamin C intake have been found to produce corresponding layers of normal and diseased tooth.

Vitamin E, which was first discovered as a factor necessary for successful reproduction, resembles vitamin C in being a reducing agent, but differs in being soluble in fats. Its chemical estimation depends on the ability to reduce ferric chloride to give the ferrous ion. Dr. T. Moore explained the action of vitamin E as a biological antioxidant. Thus it is capable of preventing the brown discoloration and the formation of peroxides which occur in the fat deposits of rats and pigs when they are fed upon large amounts of cod liver

oil, or other sources of readily oxidisable unsaturated fatty acids.

Interesting developments have arisen recently from Dam's observation that the dyestuff methylene blue, and certain other redox substances, including the anti-drink drug "Antabuse," have vitamin E activity. In Dr. Moore's experience, methylene blue could fulfil some of the many roles of vitamin E, but was quite ineffective in others.

Vitamin A

Dr. Moore also discussed vitamin A, which combines with protein in the retina to form the pigment rhodopsin, or visual purple, which is necessary for vision in the dark. He pointed out, however, that in most animals the amount of vitamin A present in the eyes represents only a minute fraction of the total contents of the body. It seems probable, therefore, that the vitamin has other important functions which do not depend on the formation of rhodopsin. Mason's theory that vitamin A favours the formation of mucoproteins as opposed to keratin, and so prevents the membranes from becoming dry by stimulating the formation of mucus, should at least form a good starting point for further research. Interesting biological interrelationships are being found between vitamin A and the sex hormones.

Vitamin D

Vitamin D is distinguished from all the other vitamins by being formed by the action of ultraviolet light. The irradiation activates either 7-dehydrocholesterol, a provitamin which can be formed by animals, or ergosterol, which is produced by low forms of life such as yeasts and moulds. According to an early theory of Harris, the main action of vitamin D is to raise the level of calcium in the blood plasma, which it may effect either by increasing the absorption of calcium from the food or by withdrawing this element from areas of bone which have already been developed. The raised level of calcium in the plasma then automatically allows the regions where bone is being newly formed to become properly calcified.

Recently Zetterstrom has claimed, however, that the vitamin may act directly on the cells producing bone by stimulating the enzyme phosphatase, which is present in bones and other tissues. A decision on how much each of the two mechanisms contributes to the whole chain of events leading to the calcification of bone must await the results of further research.

Vitamin K

In the absence through illness of Prof. Henrik Dam of Copenhagen, his paper on recent studies on vitamin K was read by Mr. A. L. Bacharach. This vitamin is concerned in promoting the clotting of blood and was given the letter K as being suggestive of "koagulation." Its precise mode of action is still rather obscure, which is perhaps not surprising in view of the extreme complexity of the clotting mechanism. According to the most modern view, a substance called thromboplastin first acts upon another called proconvertin to produce convertin. With the aid of accelerin the convertin next acts upon prothrombin to form the enzyme thrombin. Finally thrombin acts upon the soluble protein fibrinogen to produce the insoluble protein fibrin, which is the final clot.

Only experts can hope fully to visualise these complicated sequences, which are rather reminiscent of the effect of a blow passing down a long line of falling skittles. It appears, however, that the main effect of vitamin K deficiency is to cause a failure in the production of prothrombin. Evidence that other factors are also missing, however, may be found by comparing blood that fails to clot on account of vitamin K deficiency with similar blood which has been obtained by dosing with dicoumarin, the anticoagulant found in spoilt sweet clover. While both types of blood clot slowly by themselves it is possible to accelerate clotting considerably by mixing them together. Each must contain, therefore, something beneficial to clotting which is missing from the other.

Industrial Applications

Those engaged in the food industry may argue with some justification that while they desire to preserve the natural vitamins in their products they are not concerned with their mode of action in living tissues. Certainly they have no need to memorise a detailed account of all the intricate mechanisms which engage the attention of expert nutritionists and biochemists. There is often a tendency, however, for knowledge to prove of practical importance beyond the range of its original theoretical interest.

For the present there seem at least two instances in which a knowledge of how the vitamins work may affect food production and processing. Firstly, the value of vitamin C has been proved in several different ways in the preservation of vegetables and fruits. Thus it seems to be concerned, by virtue of its reducing action, in the checking of blackening in potatoes, which is caused by the enzymic oxidation of the amino acid tyrosin to form melanin. Apples which are rich in vitamin C, moreover, are said to keep better during storage than those low in the vitamin. Secondly, there is evidence that fats which are rich in vitamin E are more resistant to oxidative changes during storage than similar fats which are low in the vitamin. If pig farmers are so unwise as to risk the danger of their bacon fat going brown through the excessive feeding of cod liver oil they can at least check this fault by making sure that their animals also receive liberal supplies of vitamin E.

It seems reasonable to expect that as our theoretical knowledge of the biochemistry of the vitamins becomes more adequate and detailed many more points having a practical bearing on food manufacture will emerge.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of articles on the subjects covered. Books on food would also be considered.

Pressure Cooking and Cooling

Part I

L. C. Davis

There are a number of different types of continuous pressure cooker, but it is the agitating pressure cooker unit which has been almost exclusively adopted in the U.S.A. for many years, firstly, in the canned milk sterilising industries, next in the canned vegetables, meat, and combined hot pack canneries, and also during the past 12 to 15 years or so, in the fruit processing areas of that continent. The initial agitating continuous pressure cookers manufactured in Australia are now engaged in their fourth year of operation.

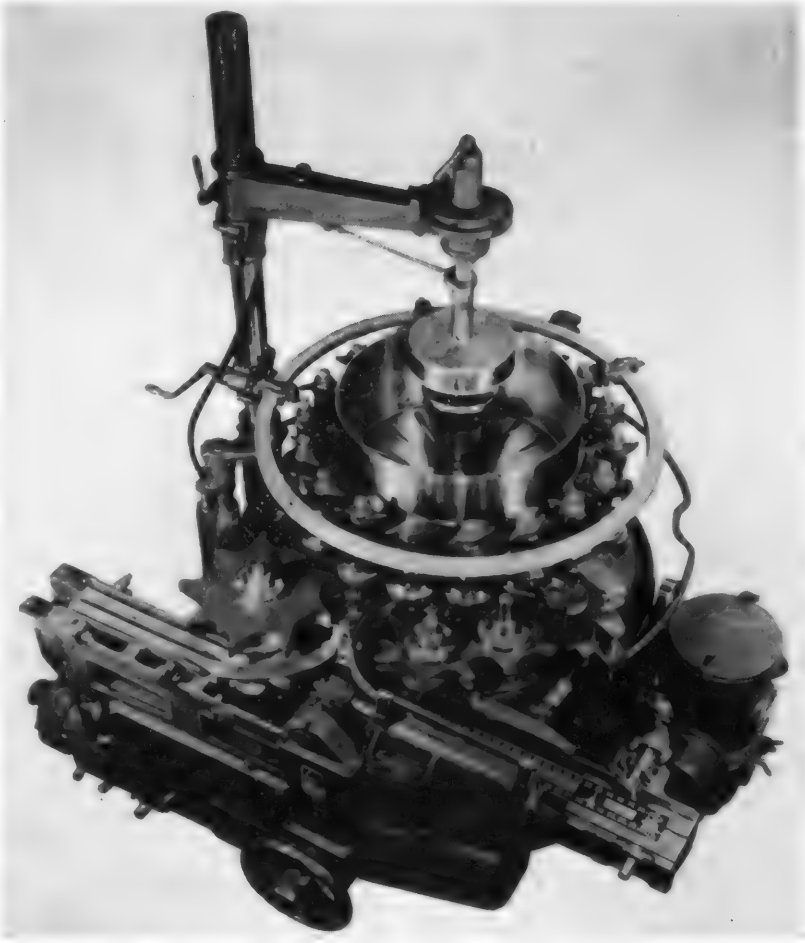
THE continuous high speed fruit cannery pressure cooking lines both in Australia and in the U.S.A. consist of a vacuum syruping unit, either a vacuum or steam flow closing machine, and a continuous pressure cooker and a direct coupled pressure cooler, the two latter units being fully automatically controlled by a centralised control panel with air operated steam, and air control instruments. The control panel is equipped with gauges for steam, air, and water, and electrical gauges and controls including starting switches, transformers, relays, safety switches, signal lights, and warning horn.

There are several other specialised features with which the pressure cooker and cooler units are equipped. These include protective stops and signals to prevent improperly positioned cans from entering the feed valve from the elevator and similar protective stops are generally located at the top of the transfer valve, in the cooler, at the top of the cooler discharge valve, and in the cooler discharge chute. These stops are provided with mercury switches which, when operated, will light an "amber" signal light directly above, thus closing the respective relay circuits. The lights are provided in order to indicate immediately to the machine operator the point at which the cause of the stop occurred.

Protection of Equipment

The primary purpose of these automatic stops is to protect the equipment. This in turn protects the manufacturer from costly delays due to jamming. In the pressure cooler, the level and flow of cooling water are automatically controlled by means of a float arrangement, and should the water rise above the maximum water level, a mercury switch in the control instrument will tilt, lighting the "red" indicating lamp and closing the relay circuit of the warning horn. Similarly, if the water level falls below the minimum water level mark while the cooler is in operation, a second mercury switch will tilt, lighting the "green" indicating lamp and closing the relay circuit of the vibrating horn.

Provision is made for the cooling of cans in the cooker shell in the event of a sudden electric power failure preventing normal operation of the line, and further, all automatically operated diaphragm valves can be by-passed



A pre-vacuumising syruper.

Abstracted from a paper read at the Fourth Annual Australian Canning Convention held at Sydney on September 2 to 4, 1952.

for hand operation in the event of an unpredicted air supply failure.

Another recently adopted feature is the automatic reel stop, and this was developed to provide a positive and automatic means of assuring that no cans leave the cooker which have not been held at the proper process temperature for the necessary length of time to complete sterilisation of the product. This air-operated low temperature reel stop is incorporated with the conventional temperature recording and controlling functions and serves to stop the reel of the cooker if the temperature drops as little as 1° below the controlled set point.

Principles of Rolling Agitation

The rolling agitation principle of the continuous pressure cooker whereby the cans are agitated in the bottom half of their rotary cycle in the reel-spiral mechanism and are stationary on the top portion of the rotary cycle is well known. It is not necessary to deal with the general function of the pressure cooker beyond saying that the cans enter the cooker shell direct from the closing machine through a rotary valve which prevents the loss of pressure and steam within the cooker. The cans are indexed into a revolving reel which is centralised with the feed mechanism of the valve, and from thereon they are advanced through the cooker shell by means of the spiral-reel mechanism as in ordinary rotary atmospheric cookers, with the exception that they are being subjected to steam pressure which is injected into the cooker from pipelines leading off a header pipe which runs the length of the shell. At the cooker discharge, the cans are automatically picked up and transferred by means of a further rotary valve and again timed into the centralised reel of the pressure cooler. At the discharge end of the pressure cooler, a third rotary valve operates and discharges the can to the atmosphere.

In the case of fruit canning, the air pressure in the cooler is set at approximately 2 to 3 lb. below steam pressure in the cooker, and as the cooler shell is baffled, the pressure is gradually reduced from the feed end to the discharge end. The cooling water supply runs contra-flow to the motion of the cans, and the average discharge can temperature is around 90° to 95°F.

Operating Speed

The normal operating speed of the pressure cooker lines, when being used on 30 oz. No. 2½ cans, is approximately 170 to 175 cans per minute, and with 16 oz. No. 1 tall cans, the speed can be increased if vacuum syruper and closing machine speeds permit. These two can sizes have been mentioned as they form the bulk of the Australian canned fruits pack. These details are confined to equipment for the processing of fruits such as apricots, peaches, pears, pineapple, and fruit cocktail, and not to vegetables and hot packs, although it is in this latter field that the true economics of continuous cooking over still batch retorting are found.

For many years past, in the U.S.A. and also in the European continent, vegetables and other commodities have been processed in this manner, and to give just one example, in the U.S.A. the average processing time in continuous agitating pressure cookers for brine-packed peas in No. 2 cans (307 × 409) having a fill in weight of 13·5 oz. and a gross headspace of say ¼ in., is 13·5 to 14 minutes at 250°F. This is mentioned merely to give a general conception of the advantages of agitating cookers over still retorting, and processors of peas will note that this processing time is approximately one-third of the normal batch retort time. The rolling agitation of the cans in the lower half of the rotary cycle in the pressure cooker tends greatly to increase the rate of heat penetration and shorten the process time required.

Heat Transfer

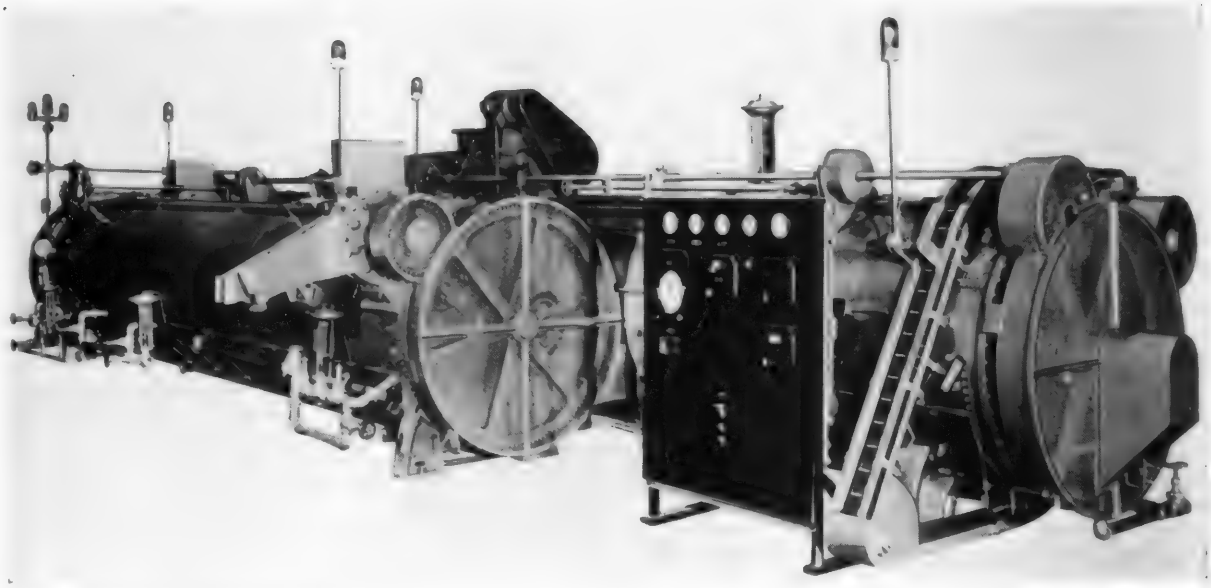
Two general types of transfer of heat are known. The first and slowest is conduction heating wherein the heat is transferred from one particle to another in a solid object. In the case of a can of food, the outer surface is rapidly heated or cooled to the temperature of the heating or cooling medium. When processing the cans, the heat from the outer surface must pass through each successive layer of the product to reach the centre of the can. When cooling, the heat from the centre must pass through all the surrounding product to the outer surface before it can leave the can. In neither case is there any appreciable movement of the product within the container. Since a temperature gradient exists from the centre to the outside during the greater part of a process, it is apparent that the outer layers of products must be overcooked in order to sterilise the inner core.

The second type of heat transfer, by convection, is more complex in its action and is controlled by such factors as agitation, fill of container, and the consistency of the product at the various temperatures during the cook or cool.

"Perfect" Convection

In heat transfer by convection a limiting condition would represent "perfect" convection, that is, convection currents of such rapidity that all portions of the fluid in the can are at the same temperature at any one time. In such a case, the rate of temperature rise or drop at any given time will depend largely upon the ratio of can surface to can volume and on the difference between the temperature of the fluid and the temperature of the heating or cooling medium.

The condition of "perfect" convection is approached in a continuous cooker by virtue of the agitation imparted to the can. When cans are heated or cooled without agitation, the indicated mechanism of heat transfer consists of the rapid rise or drop of the heated liquid in convection currents close to the can wall and the slow rise or drop of the remaining liquid, which is relatively quiescent. In the case of heating or cooling with agitation, the liquid within the container moves through the entire can and "perfect" convection is approached to a limited degree. As we ap-



A continuous pressure cooker and cooler.

proach this condition it is apparent that all parts of the can receive an almost identical processing, and no portion of the contents is overcooked as in conduction heating.

Since the destruction of bacteria or bacterial spores by heat is a function of time and temperature, the faster the total contents of the can can be heated to any given temperature, the shorter will be the process time at any given temperature. The rate at which heat penetrates into the product is therefore a most important consideration.

The object of discussing heat penetration and thermal death time studies, is to point out the advantages (in the case of fruit canning) of rolling agitation and higher processing temperatures over atmospheric cooking either by continuous or batch type units which are operated at the maximum temperature of 210°F.

Suitable Can Sizes

An obvious query that will arise is one that is relative to the various can sizes that can be processed through one particular model of the pressure cooker. The conventional models of pressure cookers suitable to handle the range of Australian standard fruit cans, are as follows: The No. 1 tall (301 × 411) and No. 2 cans (307 × 409) line, and the No. 2 can (307 × 409) and the No. 2½ cans (401 × 411) line.

However, the No. 1 tall can cannot be processed in the latter mentioned No. 2 to 2½ standard unit. It is possible, however, to process cans of up to 1 in. variation in length in the same unit, provided the diameter variation is not more than, say, $\frac{1}{16}$ in. This is accomplished by substituting the feed, transfer, and discharge valves, and making minor alterations to the positive feed elevator.

The Committee of Direction of Fruit Marketing are now installing pressure cookers that will handle the standard No. 2 cans (307 × 409), and by the change-over of the recently mentioned parts, this same unit will handle the 307 × 309 size, which is a Canadian specification.

On these particular sized cans, the units would be capable of speeds up to 260 cans per minute, if necessary. Incidentally, on the units now being installed in Brisbane, the spiral and reel angles are fabricated of stainless steel. In New Zealand during this forthcoming pea and fruit canning season, the largest processor will be using a continuous pressure cooker which will handle the No. 2 (307 × 409), the No. 2½ (401 × 411) and also the New Zealand standard 22 oz. cans (307 × 413). These three sizes will be handled without any change whatsoever to the unit.

This preamble will give some idea of the range of can sizes that can be processed in one specific unit. Frequently, it is asked if an 8 oz. can size can be put through the same cooker as a No. 2½ can; this is, of course, impossible, and strangely enough it is hard to convince some canners that this is impracticable.

Advantages of Pressure Cooking

With regard to other general advantages of pressure cookers over, say, atmospheric cookers,

TABLE I

STEAM CONSUMPTION. I. PRESSURE COOKERS

No. 2½ cans	*Cook Min.*	*Temp. °F.*	*Cans per Minute*	*Operating Steam Required lb. per can*
Peaches	16	220	148	·325
Pears	14	214	170	·303
Apricots	14	214	170	·303
No. 1 tall cans				
Peaches	14	220	203	·196
Pears	12	214	237	·184
Apricots	12	214	237	·184

TABLE II

STEAM CONSUMPTION. II. ATMOSPHERIC COOKERS AND THERMAL BOXES

No. 2½ cans (1,485 cap.)	*Cook Min.*	*Temp. °F.*	*Cans per Minute*	*Cookers plus Exhaust Box. Operating Steam Required lb. per can*
Peaches	30	210	49·5	·903
Pears	25	210	59·5	·762
Apricots	18	210	67·0	·762
No. 2½ cans (2,115 cap.)				
Peaches	30	210	51·7	·872
Pears	25	210	62·0	·767
Apricots	18	210	67·0	·722
No. 1 tall cans (2,070 cap.)				
Peaches	30	210	67·0	·464
Pears	25	210	67·0	·464
Apricots	18	210	67·0	·464

bearing in mind that fruit products are being dealt with. The comparison with batch retorting must thus be eliminated, beyond saying that it has been accepted that it takes approximately six to eight times more direct and indirect labour, and approximately 2½ to 3½ times more steam per can to process in retorts than in continuous pressure cookers. With regard to steam consumption, it has been proved both in the U.S.A. and in the Goulburn Valley in Australia by steam flow meter tests, that savings of over 50 per cent. in steam consumption per can are possible, compared with consumption when atmospheric cookers are used.

Some figures on this subject which were gathered a few years ago prior to the installation of continuous pressure cookers in the Shepparton Fruit Preserving Company, who were the pioneers in the installation of this equipment in Australia, are shown in Tables I and II.

In the instance of continuous pressure cooking with steam flow closers, the approximate steam required for each steam flow machine would be 150 lb. per hour.

Results of Flow Meter Tests

In 1950, an independent steam engineer took flow meter tests at Shepparton on the continuous pressure cooking lines which substantiated the figures quoted in the Tables. It was found that with pressure cookers and steam flow closers, including warming up and closing down, and lunch and tea breaks, each 30 oz. can was processed at the rate of ·290 lb. of steam; at the same time tests on existing atmospheric cooker and exhauster box lines including warming up and closing down, and lunch and tea breaks, showed that each 30 oz. can required ·630 lb. of steam.

It will be freely admitted that the elimination of the thermal exhauster box in favour of the use of mechanical means of obtaining vacuum in cans either by vacuum closing machines, in which cans are capped under reduced atmospheric pressure, or in steam flow closing machines where air in the headspace is swept out and replaced by steam just before the lid is placed on, does in fact conserve a great deal of steam per canning line. Thermal exhauster boxes literally devour steam. As a matter of interest, a thermal exhauster box, capable of giving, say, 10 minutes' exhaust at 80 cans per minute requires approximately 30 to 35 boiler horsepower, against the small quantity required by the steam flow attachment on a closing machine. It can therefore be seen that exhauster boxes for use with high speed pressure cooking lines are unpractical, both from the steam conservation point of view as well as the cannery area required.

(To be continued)

The photographs illustrating this article are published by courtesy of the Food Machinery and Chemical Corporation.

The Functions of the Company Director

THE functions, powers, duties, and statutory and legal obligations of the company director are clearly described in an attractively produced book* written principally to give assistance and advice to those for whom the subject has hitherto been *terra incognita*.

The man (or woman) who for the first time takes on the duties and obligations of a directorship must often find himself at sea. It would be an expensive matter to seek legal or other expert aid every time any doubt arises, and a *vade mecum* of this type should, in many cases, avoid this. A glance at the contents table, at the Table of Cases, and at the index should enable him to put a finger upon the answer to any problems that may arise.

The work is intended not only for the neophyte, but also for the established and experienced director of either public or private company. The law is intricate and onerous; latter-day commercial and economic developments continuously introduce new elements which, although they may not be associated directly with company trading, nevertheless have a more or less close bearing upon it.

Written and compiled by Mr. Alfred Read, C.B.E., F.C.I.S., F.Inst.D., and issued under the authority of the Council of the Institute of Directors, the book has a foreword by the Rt. Hon. Oliver Lyttelton in which he says: "Industry does not consist of management and labour, but of *direction*, management, and labour. The best managers and the hardest-working and most loyal labour force in the world will be frustrated if the general direction of the company is not sound." That cannot be challenged, and the primary purpose of this book is to ensure sound direction in every possible place.—C. J. S.

* *The Company Director, His Functions, Powers, and Duties.* By Alfred Read, C.B.E., F.C.I.S., F.Inst.D. Pp. 228 + xv. Jordan and Sons. Price 30s. net.

Fungal Enzymes in Breadmaking

SOME interesting opinions on the use of fungal enzymes were expressed by H. W. Hanschka at a meeting of the American Society of Bakery Engineers.

The term fungal enzyme might be considered a generic term, as it covered a group of materials that were somewhat different in composition. Some were high in amylases, others were high in protease. Some were a combination of both and others were combined with diastatic malt. All other conditions being the same in doughs, the addition of these materials might be expected to produce somewhat different results. To obtain best results, the proper type of material must be selected.

In recent years, many bakers had increased the capacity of their plants by reducing the baking time of their product. With more pounds of dough per hour, it was necessary to make either larger doughs or run a faster schedule. In many cases this created a mixing problem that made it difficult to adhere to time. In many such cases it had been found that the use of an enzyme high in protease helped to develop doughs more rapidly and made it possible to reduce mixing time by as much as 15 or 20 per cent. This in turn made it easier to keep to schedule.

In those cases where tough flour presented a problem, with doughs that could not be properly developed in mixing, resulting in buckiness at divider and moulder, the high protease type of enzyme had been found to be helpful by making doughs more extensible and improving machinability.

It was safe to say that all the fungal enzymes tenderised and mellowed doughs. It was also safe to say that all doughs did not require additional mellowing, and if enzyme preparations were used in such cases they could weaken a dough to the point of damaging the finished product.

In many cases the enzyme materials that were high in the amylase factor could be used to good advantage with flours that were low in diastatic activity. When used with such flours, it had been found that they did not produce stickiness, even though they might raise the diastatic activity beyond the point that could be obtained with diastatic malt without damaging the dough.

Some bakeries added them to the dough and others to the sponge, and used variable proportions. There had been cases where 1½ to 2 oz. per 100 lb. of flour was all that was required to obtain desired results. In other cases, two or three times this amount was required. The proportions also varied according to the potency of the material, which varied considerably between suppliers.

For the most part it seemed desirable to use fungal enzymes in the sponge stage. However, when used in this stage, sponge volume was greatly increased, sometimes beyond the capacity of the troughs to contain them. In such cases many bakers used the enzymes in the dough stage. To obtain full effect, it was usually necessary to use from 50 to 100 per cent. more when used in the dough.

It had been suggested that fungal enzymes could be used to retard staling or keep bread softer. Little evidence had been forthcoming to support this theory as they seemed to have not much more effect than malt, or sugar used in somewhat higher levels.

How to Make Chocolate and Confectionery

SUCH has been the acceptation of the first edition of Mr. Williams' book published towards the end of 1950, that a second edition* has been called for.

As the author states in a preliminary note, "technical procedure remains more or less constant, changing only when essential materials are in short supply," but he has added some useful chapters in the new edition, one of which deals with fortified confectionery.

Global upheavals and interrupted food supplies have caused greater value to be attached to easily assimilable confectionery, which in its infinite variety, contains many of the essential nutritive elements demanded by the body for its well-being. In this chapter are given the Calories per lb. for a number of articles of confectionery and the figures compared with common foods, such as sugar, milk, eggs, and steak. Some of the main items used for the fortification of confectionery are given.

Another new chapter describes the manufacture of candied fruits, among which are included pineapple, greengages, pears, apricots, and cherries, and a short bibliography has been added to the chapter on research.

The main part of the book follows the scheme of the first edition. Following a short historical chapter, sugars, scientific control, colloids, raw materials, chocolate and sugar confectionery plant, and wrapping machines are dealt with, after which follow chapters on the individual classes of chocolate and sugar goods in which typical formulae are given and processes clearly and concisely described.

As far as the latter are concerned, the author stresses that they are based on personal experience, which must needs increase the confidence of the reader. The two final chapters are devoted to factory organisation and research.

The book is copiously illustrated with all types of the latest plant and equipment, together with descriptions of their working and capacities, which will be invaluable not only to the confectioner who wishes to bring his plant up to date, but also to those contemplating entry into the industry. Having acquired the plant, he will be able to get on with the job by means of the comprehensive processing instructions contained in the book.

* *Chocolate and Confectionery*. By C. Trevor Williams. Pp. 239+xxi. Leonard Hill, Ltd., London. Price 25s.

Scientific Research in Britain

The grave anxiety at the delay in giving full effects to post-war plans, expressed by the Advisory Council of the Department of Scientific and Industrial Research in their 1950-51 annual report, does not appear to have lessened in the ensuing year. In their latest report for 1951-52, an abstract of which is given here, they view with steadily deepening concern the relation between scientific needs and scientific resources.

THE difficulty common to all D.S.I.R. establishments is that of drawing a balance between advisory and *ad hoc* work on the one hand and longer range research on the other. The dissemination and full use of existing information is of the utmost importance, but the enquiries put to the D.S.I.R. establishments inevitably disclose deficiencies in knowledge that must be made good before a fully satisfactory answer can be given to a number of them.

As industry advances and becomes more conscious of the help to be gained from science, these deficiencies will certainly become more serious unless the reservoir of scientific knowledge from which answers are derived is enlarged by further research.

Concern at State of Research

Both the Advisory Council and the Advisory Boards are already deeply concerned at the inadequacy of the effort that can be devoted by the D.S.I.R. to the longer range research. Basic research is hardly worth doing if the effort that can be devoted to it is insufficient to secure steady progress, and the Council consider ill-founded the suggestions made from time to time to reduce the present meagre effort, their view being that there is no alternative to the planned expansion of D.S.I.R. that was recommended six years ago.

Very much the same considerations apply to the Research Associations. Few, if any of them, have incomes large enough to deal with all that is needed to be done; they often find, for example, that essential basic work is elbowed out by more immediate problems and that in dealing with these they are in danger of having to pursue too many objectives at the same time.

The work carried out by the Food Investigation Organisation has covered the subjects of meat, fish, eggs, fruit and vegetables, electronic sterilisation, dehydration, and basic research.

Meat Storage

Work is being concentrated on improving the quality of frozen meat through the controllable factors prior to slaughter and during storage. In continuation of the collaborative work with the Southern Dominions on frozen beef, two members of the staff of the Low Temperature Research Station have visited Australia for 12 months to work in the Abattoir Laboratories of the Australian C.S.I.R.O. at Brisbane. They are applying to beef animals, on a commercial scale, techniques which have shown promising results on a laboratory scale at Cambridge. A preliminary series of experimental shipments has shown that the better the initial quality of the meat, the less has been the damage suffered as a result of freezing.

Work on whalemeat has been confined to a study of means of preventing its deterioration during storage. It has been found that the development of rancidity can be greatly reduced by the addition of an antioxidant, *e.g.* 0·05 per cent. ascorbic acid. A method of control has been suggested which consists in dipping the frozen blocks in a solution of ascorbic acid, thus providing a protective glaze of ice which is also resistant to the penetration of oxygen.

Fish Investigations

As a result of a survey on the handling and stowage of fish on board trawlers fishing distant waters with a view to improving the quality of catches, recommendations have been made which call for a higher standard of cleanliness at all stages in handling and stowage, avoidance of bruising, tearing, and crushing, and better use of ice.

A numerical scoring system for the sensory assessment of the spoilage of wet white fish stored in ice has been developed and used as a research tool for comparing the condition of cod, haddock, and similar species subjected to various handling and stowage treatments. It has become clear from an examination of some 3,000 samples of fish that estimation of trimethylamine is not satisfactory as a single unsupported test for spoilage. No objective method of assessing quality has yet been found that excludes the use of a panel, properly trained in sensory observation.

Possibilities of using surplus fish for export to protein-deficient areas have been studied. Stockfish, which is produced by open-air drying of unsalted cod, has been made at the Torry Research Station in hot air driers. Dried products have been made from herring similar to those produced in the tropics from local fish.

Deterioration in Frozen Egg

Some of the frozen egg imported into the United Kingdom has been affected by a form of mustiness; a search for the specific bacteria believed to be responsible was unavailing since the material had been pasteurised before freezing. The intensity of fluorescence of an extract of the material was found to be related to the degree of off-flavour. It has been shown experimentally that a certain type of bacteria when injected into fresh shell eggs produces concomitantly a musty off-flavour and a fluorescence in the extract which bear a relation to one another similar

to that found in the imported eggs. The conclusion may be drawn that the deterioration in these eggs was due to the action of this type of bacteria prior to pasteurisation.

Fruit and Vegetables

A mobile cold store has been designed and constructed and is now being used for experiments and demonstrations of the pre-cooling of fruits and vegetables before distribution. Solid carbon dioxide and crushed ice are also being used during distribution. These experiments are being carried out to find a method of eliminating the wastage and deterioration which occur during the distribution of such commodities as lettuce, plums, strawberries, and Cornish broccoli to the home market.

Experiments are being continued on the commercial storage of apples and pears. The effects of activated charcoal and ozone in gas and cold stores are being tested in view of the advantages for their use claimed in America and elsewhere.

Work has also continued on the storage of potatoes, and general recommendations about the height of stacking and the need for ventilation can now be given. The vapour of industrial amyl alcohol has been used successfully to retard the sprouting of potatoes stored in bulk on a semi-commercial scale. The use of volatile inhibitors which can be applied late in the storage life should be a useful alternative to the dusts which are now employed and which have to be applied at the beginning of the storage season.

Progress has been made in identifying some of the many compounds which have been shown by chromatographic methods to be present in apples and in the identification of the volatile products and the composition of the skin. The identification of the compounds present in the apple is a necessary preliminary to a fuller understanding of the ripening process.

Electronic Sterilisation and Dehydration

An investigation into the potentialities of electronic sterilisation, with the co-operation of the Medical Research Council Radiotherapeutic Research Unit, Hammersmith Hospital, has shown that a number of the main claims of this process can be substantiated. Deleterious effects, mainly of an oxidative nature, have been encountered, however, and although these can be minimised by suitable treatment of the food before, during, and after irradiation, complete control has not yet been achieved.

A study of some of the problems relating to the dehydration of foods has been resumed, but since these are concerned, for the most part, with the long-term storage of these products, some time must elapse before the results of this work are forthcoming.

Basic Research

The use of ascorbic acid as an antioxidant is only one of the directions in which this natural constituent of living tissues is being brought into employment in food technology. It is effective as a flour improver and in retarding enzymatic browning. Applications in both these directions are being pursued, the former (in conjunction with the Ministry of Food and the British Baking Industries Research Association) by exploring the possibility of recovering ascorbic acid from aqueous extracts of lucerne; the latter, in the course of a study of the mechanism of action of phenolases (phenol oxidising enzymes) on the naturally occurring phenols present in many plant and animal substances.

The biochemical approach to the study of the respiration of plant organs is to try to identify parts of the mechanisms *in vitro*. A striking success has been the demonstration that isocitric and malic acids can be oxidised by enzymes isolated from peas by successive transference of hydrogen from isocitric and malic acids through co-enzyme II to glutathione, thence to ascorbic acid and finally to oxygen. This allocates possible functions to the important plant constituents ascorbic acid and glutathione. Other similar sequences are now under investigation.

While the newer methods of analysis are being increasingly employed in such studies as these, which mainly concern the simpler biological molecules, the equally difficult problems presented by the macromolecules and the complexes formed between them are also being attacked. Ion-exchange resins have already been used to purify a number of basic proteins, such as lysozyme and cytochrome C, and a considerable advance has now been made by extending this technique to the separation of certain neutral proteins.

Another type of complex system under investigation is that between heavy metals and proteins or amino acids. It is known that the catalytic activity of naturally occurring heavy metals in biological systems depends on their mode of combination. It would be expected, therefore, that the oxidative deterioration that occurs in some foodstuffs as the result of heavy metal contamination would be influenced by other constituents of the system, such as proteins and amino acids.

The problem has been approached by combining copper with a number of amino acids and measuring the catalytic effect exerted by the complexes on the oxidation of ascorbic acid by oxygen. In most instances, the pronounced catalytic activity of ionic copper is enhanced when it enters into combination with an amino acid.

A similar study is being made of the complexes formed by copper with peptides of increasing size.

Pest Infestation

The Pest Infestation Laboratory is becoming increasingly concerned with colonial problems relating to the safe storage of foodstuffs, especially of cereals. The appointment of a Colonial Liaison Officer is already proving of value in this connexion. He has made one tour to East Africa and has not only been able to give useful advice on local problems of grain storage and control of infestation, but has also brought back to Britain many problems for solution in this and other research laboratories.

In addition to the work carried out on grain storage problems, the Laboratory has made a study of methods of control of one of the most serious factors in the destruction of foodstuffs by insects —cross infestation from one consignment to another.

If an effective method could be developed, either of preventing the escape of insects from sacks of infested material or of preventing their access to "clean" goods, real progress would have been made. One such possibility is by the use of sacks impregnated with an insecticide. Hessian and twill sacklets impregnated with approximately 0·1 per cent. by weight of pyrethrins or 0·05 per cent. pyrethrins + 0·5 per cent. piperonyl butoxide gave virtually complete protection against the Granary Weevil and the Flour Beetle.

The tests were performed with freshly treated sacking; the durability of the impregnation treatments and other points of practical importance now need to be investigated.

Tests so far completed to compare the relative efficiency of vacuum fumigation and straightforward fumigation at atmosphere pressure show that the technique in which the fumigant alone is introduced to the evacuated chamber and the vacuum sustained for a period is more efficient in promoting penetration than the technique in which a mixture of air and fumigant is introduced to the evacuated chamber until the pressure approaches atmospheric. It should be possible to improve the efficiency of the former process by breaking the vacuum some time before the end of the treatment.

Work of Research Associations

Appended to the report of the Advisory Council is a summary of the work carried out by the various Research Associations. Among these is the British Baking Industries Research Association, who have carried out considerable work in preparing scientific data on antioxidants, food colours, and other possible ingredients on behalf of the industry for submission to the Preservatives Sub-Committee of the Food Standards Committee of the Ministry of Food.

The correlation of results from different flour testing instruments with one another and with baking tests is being actively pursued in collaboration with the Research Association of British Flour Millers and panels of members. The initial work on bread flours is now being extended to cover biscuit and cake flours.

Other investigations made by the B.B.I.R.A. have been concerned with the staling of bread, rancidity in cakes and biscuits, emulsifying agents in cakes and biscuits, consumer preference and organoleptic characteristics, the efficiency of dough dividers, the use of plastic materials, and the prevention of mould and bacterial development in bakery products.

Some of the main subjects of the programme of the Fruit and Vegetable Canning and Quick Freezing Association are:

1. Suitability of new varieties of fruit and vegetables for canning and quick freezing.
2. Causes of stone-gum in plums.
3. Measurement of texture of green peas for canning and quick freezing.
4. Prediction of planting or picking dates of peas for canning or quick freezing.
5. Factors affecting texture of peas for canning as processed peas.
6. Effect of processing conditions on the quality and nutritive value of canned vegetables.
7. Studies on the internal corrosion of cans, including work on electrolytic tinplate and on identification of natural accelerators and inhibitors.
8. Causes of deterioration in flavour of quick frozen foods on storage or after defrosting.
9. Studies on the mechanism of destruction of bacterial spores by moist heat.
10. Survey of types of thermophilic infection of canned vegetables.
11. New methods of processing: aseptic canning, treatment with radiation, use of antibiotics.
12. New types of container and can lining.

The work of the Research Association of British Flour Millers has been concerned with milling and baking of home-grown wheat, structure of the wheat grain, washing of grain, biochemistry of wheat, flour improvers, and oat and oat products.

A study is being made by the British Food Manufacturing Industries Research Association of the keeping qualities of different types of margarine in relation to the nature of the ingredients, methods of production, and any preservative used. As a prelude to the examination of the deterioration of certain products due to non-enzymatic browning, a comprehensive and critical review of the literature on the subject has been prepared which should form the basis of discussions for the technical panels drawn from member firms.

Ultrasonics in Food Manufacture

A CHECK is kept on the quality of tomato ketchup produced in an American factory by the use of an ultrasonic monitor. Ultrasonic waves are generated in the sauce and a special meter observes their amplitude at a point some distance away from the generator. This amplitude depends on the viscosity of the sauce and so provides an accurate quantitative indication of its consistency.

The quality of the fruit entering the plant may also be checked by photo-cells designed to respond only to certain colours. Thus, red tomatoes would pass without any signals being made, but green ones would activate the photo-cells and be automatically rejected.

Among other ultrasonic techniques described (*The Financial Times*, April 13, 1953) was that used in a brewery in order to make for efficient use of hops. This technique is similar to one reported recently by a British glue manufacturing firm who use ultrasonic waves to break down the cells of the animal fats used in the initial stages of the processes. Long tubes containing ultrasonic generators, driven electrically, are lowered into the liquid containing the hops. Powerful vibrations from the generators break down the cellular structure of the hops, so that they readily give up all their bitterness to the liquid. It is claimed that its use effects a 40 per cent. saving in the amount of hops used.

Universal approval of a sample of cider is recorded.

Cider Sampling Day at Long Ashton

Sunny weather prevailed on Long Ashton's Cider Sampling Day, during which it was possible to show ciders of good vintage quality as a result of the high specific gravities and high quality of the juices from the 1952 harvest. The cider-making season had been unusual in that the fruit matured quickly, whereas the juices had been very slow in their rates of fermentation. At the Station it had been necessary to hasten some of the fermentations by the addition of nitrogen or of vitamins to the juices. Where no additions had been made the ciders were, in many cases, still at gravities above 1025. Following the slow rates of fermentation some of the bottled ciders were not yet fully conditioned.

THE past season having given record perry crops, an excellent opportunity had been presented for beginning the survey of perry varieties which had been planned as part of an expanded programme of perry-making. Some 80 perry varieties had been tested with a view to selecting varieties for a new bush perry plot to be planted at Long Ashton. The first part of the morning programme was devoted to a selection of perries from these vintage trials.

Perry Samples

The perries in Section I were all centrifuged and filtered at a specific gravity of 1025 and were naturally conditioned in bottle. The first four were made from varieties taken from the original perry orchard trials of 1910. These were Moorcroft (Bittersharp (No. 1), Oldfield (Sharp) (No. 2), Barnet (Sharp) (No. 3), and Judge Amphlett (Sharp) (No. 4).

The last of the series (No. 5) was made from a blend of Black Huffcap and Chandos Huffcap.

Cider Varieties

The rest of the programme was given to ciders, which fell into four groups. The first of these (Section II) consisted of single variety ciders, *e.g.* Kingston Black (Bittersharp) (No. 6) and Crimson King (Sharp) (No. 7), which are recommended for planting, and Dufflin (Bittersharp) (No. 8), Lady's Finger (Sharp) (No. 9), Hancock's No. 1 (Bittersharp) (No. 10), and Cummy Norman (Bittersweet) (No. 11) which were the varieties chosen for Vintage Quality Trial.

These ciders were all centrifuged and filtered at a specific gravity of approximately 1025 and were naturally conditioned in bottle.

The ciders in Section III, which aroused a great deal of interest, showed the effect of fermentation at different temperatures.

A rather sharp blend of Bramley's Seedling and Sweet Alford was divided into two parts and fermented to dryness at different temperatures. The ciders were then centrifuged, filtered, sweetened to 1025, saturated with carbon dioxide, and pasteurised in bottle.

No. 12. Fermented at 15°C. (59°F.)
No. 13. Fermented at 25°C. (77°F.)

The effects of malo-lactic fermentations in English cider-making have been underestimated in the past although they are of widespread occurrence. In the south-western regions, where the cider fruit is low in acidity, bacterial

Prof. Wallace (right) and Dr. Pollard making a weighty decision.

action can be undesirable, as it leads to a further fall in acidity which can produce conditions favourable to disorders. In the eastern regions, where the fruit is higher in acidity, such a fall may be welcome and give ciders of more balanced flavour. Ciders Nos. 12 and 13 showed how an increase in temperature hastens the bacterial breakdown of malic acid, while a lower temperature retards it. The temperatures quoted are higher than would be encountered in normal cider-making; they were used for the purpose of demonstrating the general principle.

Use of Selected Yeasts

The ciders shown in Section IV were all pure yeast fermentations in sterilised juice. A bulk of Kingston Black juice was depectinised and sterile filtered and different portions were fermented by the addition of selected yeasts. No. 14 was fermented by Yeast A, No. 15 by Yeast B, No. 16 by Yeast C, and No. 17 by Yeast D.

After fermentation to dryness, the ciders were clarified, sweetened, sterile filtered, carbonated, and bottled aseptically.

It was considered by the visitors that there were some definite differences in flavour, particularly between No. 15 and the others. There was a majority preference for the last two (16 and 17) with a slight balance in favour of No. 17. Some of those present still held the view, however, that the use of selected yeasts did not give better ciders than did fermentation by the natural flora of the juice.

The last group of ciders in Section V show the effects of different champagnisation treatments. In the first pair a Kingston Black juice was fermented in the normal way in a vat and artificially carbonated. At a specific gravity of 1025 part of the cider had been removed and the fermentation completed in a pressure cask, thus carbonating the cider with its own carbon dioxide. The last two ciders gave a similar comparison between a cider made by ordinary fermentation and one champagnised in bottle and disgorged by the customary technique as applied to champagne.

The meeting closed with the toast of "Cider" in glasses of the last mentioned brew.

After lunch in the Cider House, visitors studied exhibits relating to recommended varieties and distribution of orchards in the West Country. Single variety ciders and perries and ciders illustrating specific points of interest were also available for testing.

Other aspects of the work of the Cider and Fruit Products Section were seen in the laboratories, and parties were conducted to view the bush cider plot thinned for automatic spraying trials and the plantations for nursery propagation and building of cider trees.

Some Constituents of Olive Oil

ALTHOUGH constituting only about one per cent. of the weight of the oil, the unsaponifiables of olive oil are represented by a wide variety of substances including terpenes, glucosides, alkaloids, purine bases, chlorophyll, lipolytic enzymes, and phosphatides. The last-named group, which include lecithin and cephalin, is considered to be an important factor in the intermediate metabolism of fats. Another constituent of the oil is the dye which imparts to it the green or yellow colour and which is possibly an anthocyanine with a biological significance (M. Mitolo, *Alimentazione*, Milan, August, 1952).

In respect of the vitamin content a distinction must be drawn between refined oils of commerce and virgin olive oil. A commercial oil was found to be ineffective in preventing the symptoms of vitamin A deficiency in rats, whereas the virgin oil from the same source contained enough vitamin A to rectify the deficiency.

The vitamin A content of olive oils appears to be proportional to the degree of expression in course of production. The low solid fatty acid content of the glycerides of olive oil (Italian olive oil usually contains 72 per cent. liquid glycerides and 27 per cent. solid glycerides) favours the assimilation of vitamin A by the human organism. This contrasts with arachis oil, the high solid fatty acid content of which may result in elimination in the faeces of as much as 90 per cent. of the vitamin A administered. Olive oil is also valuable for its content of provitamin D, the antirachitic factor, and of vitamin E. On the other hand, it is free from vitamins B_1, B_2, B_3, and C.

Fluorine in Foods

The Food Standards Committee has considered a Report by its Metallic Contamination Sub-committee recommending revision of the limits of fluorine in acid phosphates and related foods laid down in the Fluorine in Food Order, 1947.

FLUORINE is found in the bones and teeth of man and animals in amounts which usually increase with age. The normal range of fluorine content of the bones of land mammals has been estimated at 100 to 1,000 p.p.m. or more and in man from 200 p.p.m. to 800 p.p.m. The fluorine content of teeth is less than that of bones and is lower in the enamel than in the dentine.

There is considerable evidence that the drinking of water containing about 1 p.p.m. fluorine is accompanied by a reduction in the incidence of dental caries. On the other hand, the drinking of water containing between 1·5 and 2 p.p.m. fluorine has been recognised since 1916 to be responsible for the dental condition known as mottling of the enamel. The ingestion of fluorine in large amounts may lead to overgrowth and brittleness of the bones and calcification of ligaments and tendons which in extreme cases may cause immobility and death in animals and severe malformation in man.

Other Effects of Fluorine

In May, 1946 the Inter-Departmental Committee on Food Standards published a report on the question of prescribing limits to the fluorine content of acid phosphates used for food purposes. The Committee stated that on the evidence then available it was possible to make only an approximate estimate of the maximum amount of fluorine which could be ingested daily over a period of years without harmful effect. At that time a small but indispensable part of the acid calcium phosphate used for food purposes was manufactured from rock phosphate highly contaminated with fluorine.

The Medical Research Council who were consulted by the Committee pointed out that the effects of fluorine are cumulative and that fluorine absorbed in small quantities over a sufficient period of time can produce pathological changes in the kidneys and gross lesions of bone in animals. The safest procedure would be to prohibit the use of A.C.P. made from rock phosphate for food purposes, but, having regard to the supply position at that time and to the small proportion of A.C.P. which is used in such foods as self-raising flour, they considered that a limit of 300 p.p.m. of fluorine in A.C.P. would be safe.

The Fluorine in Food Order, 1947, embodied the Committee's recommendations and set the limits to the fluorine content of acid phosphates used in the manufacture of food and baking powders and self-raising flour shown in the table below.

Fluorine in Tea

It appears that in general drinking waters containing 1·0 p.p.m. or more fluorine provide the principal source of dietary fluorine and that the majority of foods found in the average diet contain from 0·2 to 0·3 p.p.m. or less fluorine in the food as consumed. There are, however, one or two notable exceptions. Acid calcium phosphate produced from rock phosphate has been referred to above; apart from this, it has been found that tea (dry substance) may contain up to 100 p.p.m. fluorine, while that of fish, including shellfish, may range from 5 to 15 p.p.m.

An enquiry into the urinary excretion of fluorine in some New Zealand subjects showed that tea is a major source of fluorine in New Zealand where the water supplies contain only a small quantity of this element (of the order of 0·05 to 0·3 p.p.m.); the tea used in this enquiry had a fluorine content of 68 p.p.m., corresponding to an average daily intake of fluorine of about 0·42 mg., an amount well below the level at which toxic fluorosis could occur.

Fluorine balances after the addition of supplements of fluorine to the food and drinking water of a few young men were the subject of a joint enquiry in 1945. The results showed that about 4 mg. of fluorine could be absorbed daily by healthy persons without an appreciable risk of its storage in the body, and that urine and sweat were the chief avenues for its elimination.

Exposure to Fluorine Compounds

The hazard to man and animals arising from exposure to fluorine compounds emanating from fac-

Articles of Food	*Fluorine Content*
(i) Calcium acid phosphate, sodium acid pyrophosphate, or any other acidic phosphate.	300 parts per million.
(ii) Any article of food (not included in items (iii) and (iv) below) containing calcium acid phosphate, sodium acid pyrophosphate, or any other acidic phosphate and intended for use in the composition or preparation of food.	300 parts per million parts of the calcium acid phosphate, sodium acid pyrophosphate, or other acidic phosphate present.
(iii) Baking powders, including golden raising powder.	(*a*) 100 parts per million parts of the article of food where such article yields less than 15 per cent. of available carbon dioxide. (*b*) 133 parts per million parts of the article of food where such article yields not less than 15 per cent. of available carbon dioxide.
(iv) Self-raising flour or any similar mixture (not included in item (iii) above) containing a farinaceous substance and an acidic phosphate.	8 parts per million parts of the article of food.

tories manufacturing aluminium near Fort William, Scotland, was the subject of a report issued in 1949. Some of the older workmen who had inhaled fluorine for a large number of years showed bone changes of the type generally recognised to be produced by fluorosis, but none of the workers suffered clinical disability. Sheep and cattle grazing near the factories suffered from gross deformity of the teeth and jawbone which made mastication difficult or impossible and led to inanition.

A paper published in 1948 discussed the occurrence of fluorosis in farm animals arising from industrial contamination of pasture in connexion with the manufacture of bricks in Bedfordshire, the calcining of ironstone in Lincolnshire, and the fumes from a colour and enamel factory in Staffordshire. It was shown that the contamination of vegetation was entirely superficial and not due to fluorine compounds carried down into the soil by rain.

Aerial Contamination

The authors record their general impression that the hazard to people living in these areas was negligible and that the problems of aerial contamination were entirely different in veterinary and human medicine, mainly because with farm stock the source of danger is grass and hay, which may be heavily contaminated, and no ill effects have as yet been attributed to inhalation. With the human subject on the farm the dietary risk is confined to exposed outer leaves of vegetables which are either discarded or washed and in any case form a very small part of the total food intake. On the other hand they point out that in view of the longer span of the life of man small changes over long periods of time may be significant.

Fluorine in Drinking Water

The problems connected with fluorine in drinking water are under continual examination by the Medical Research Council. The relatively high fluorine content of some fish can be ascribed to the fluorine content of the sea, which is of the order of 1 p.p.m. and is of natural occurrence. The New Zealand enquiry suggests that the drinking of tea is not likely in itself to give rise to the absorption of fluorine in quantities which could cause toxic effects.

Recommendations of Committee

The Committee, therefore, have concluded that the only point which arises for consideration is whether the limits of fluorine in acid phosphates and related foods laid down in the Fluorine in Food Order, 1947, call for revision. It has been observed that allowing for a maximum daily consumption of about 100 g. self-raising flour or an equivalent quantity of baking powder, these limits would imply the addition of 0·8 mg. of fluorine to the daily diet and that this quantity, taken in solid food, is not by itself objectionable. On the other hand the ingestion of fluorine in solid food serves no known physiological purpose and if the present limits are higher than are required in good commercial practice there is no advantage in perpetuating them.

The manufacture of acid calcium phosphate from rock phosphates is no longer a necessary part of the supply for food and, with reasonable precautions, the fluorine content of acid phosphate produced from elemental phosphorus can be kept within a limit of 30 p.p.m. This figure is already enforced in the Canadian Food and Drug Regulations, 1949, and the Committee recommend that it should be adopted in this country also.

A limit of 30 p.p.m. fluorine for acid phosphates would imply a limit of 10 p.p.m. for baking powders, but in revising the limit for self-raising flour, allowance must be made for fluorine which may be contributed by the flour and by *creta*, and for the difficulty of ensuring a uniform distribution of *creta* in flour. For self-raising flours, therefore, a fluorine limit of 3 p.p.m. is recommended.

Research at East Malling

THE work of the East Malling Research Station for its fortieth year, covering the period from October 1, 1951 to September 30, 1952, is described in the recently published report, which is arranged in four parts.

The first part contains the farm report, in which is outlined the treatment of the various experimental plantations and fields and the size of the crops harvested. Crops as a whole were good but the marketing of some of the fruit, especially cherries and plums, was difficult.

Part II reviews the progress of the research programme as a whole, and research reports and reviews comprise part III. The full text is given of the fifth Amos Memorial Lecture by Prof. H. B. Tukey on the subject of developments in fruit culture in America. It also includes papers on the new Malling-Merton rootstocks, spring frost damage, the designing of experiments, the assay of growth substances, special culture methods of growing trees, the analysis of leaves, diseases, especially Verticillium Wilt of hops and virus diseases, concentrate spraying, various pests and beneficial insects and the glass slide test for fungicides. In all Part III contains 27 separate papers.

Eight bulletins for growers appear in Part IV. Written in non-technical language, these bulletins make available to the grower the practical results of research. They deal with the new Woolly Aphid resistant rootstocks for apples, irrigation requirements of orchards, "double-shield" budding of pears, strawberry varieties, virus diseases, and the agreed common names which are intended to simplify reference to the many complex chemicals used nowadays.

Fully illustrated with many line drawings and 36 pages of photographic plates, the report contains a list of the Governing Members of the Society, the Executive Committee, and the staff, and also has a very comprehensive page index.

Bone Char Research

Increased understanding of the properties of the commercial solid adsorbents including activated aluminas, activated bauxites, activated charcoals, activated carbons, bentonites, fuller's earth, bone chars, diatomaceous earth, ion-exchange materials, magnesium silicates and silica gels and their basic behaviour as related to structure has resulted from a long-range co-operative programme of research initiated at the National Bureau of Standards, Washington, D.C., in 1939 for a fundamental study of sugar refining problems. Of particular interest to sugar refiners are the results obtained for bone char. Exhaustion of the char with repeated use has been shown to be accompanied by a reduction in surface area of the granules, which are found to retain the intricate and porous structure of bone even on a submicroscopic level. Further studies aimed at improvement of the present methods for revivification of the used char are now in progress.

BONE char is a granular solid absorbent used in great quantities for the decolorisation and purification of raw sugar. This is accomplished on a plant scale by passing the sugar liquor through one of a number of filters about 10 ft. in diameter and 20 ft. deep which contain the char. Approximately 9,000 million pounds of raw cane sugar are refined annually in the United States, requiring the use of approximately half this weight of bone char. Actually, so enormous a quantity of bone char need not be in existence at any one time, since in practice the char undergoes many repeated regenerations.

Although large scale revivification of bone char by a process involving successive washing, drying, and heating has been employed in cane sugar refineries for about 50 years, improvements in revivification methods have not kept pace with modern trends in industrial operations. The gradual exhaustion of adsorptive properties with use and the small loss of dust formed in attrition, must be compensated for by a small and steady addition of new char. Moreover, the properties of the resultant char mixture are not always predictable. An analysis of what actually occurs is thus of great practical value to the industry.

Initiation of Research Programme

Prior to 1939, detailed basic knowledge of the bone char process in sugar refining was very meagre. For a long time it had been evident that additional scientific information regarding the fundamental nature of commercial solid adsorbents was necessary for further improvement in sugar refining technology as well as in the other applications. A research programme for such a study was initiated at that time by Frederick J. Bates of the National Bureau of Standards. Interest in the project under the direction of Dr. Victor R. Deitz of the Bureau's surface chemistry laboratory, has steadily increased until today industrial supporters of this work include almost all the cane sugar refiners and bone char manufacturers of the United States as well as those in Canada, England, Australia, and South Africa. Close co-operation between the Bureau and the sponsors is attained through the Bone Char Advisory Committee composed of members of the industry and a staff member of the Bureau.

To establish a basis for extensive research, a comprehensive survey of the scientific literature on adsorption and adsorbents was begun at the Bureau in 1939, resulting in 1944 in the publication of a 958 page volume entitled "Bibliography of Solid Adsorbents."

By 1946, the project had reached a stage where certain investigations could use the large scale facilities of a refinery to good advantage. Fortunately, relations between the Bureau and the industry had developed to a point where a number of the sponsors were eager to co-operate. Commercial facilities for handling large quantities of sugar liquors

An unusual photomicrograph of a service bone char (35×) made under oblique illumination from three sides by the microscopic analysis laboratory of the National Bureau of Standards.

Apparatus developed at the National Bureau Standards for simultaneous determination of the surface areas of four samples of commercial solid absorbents on the basis of the adsorption of gases at low temperatures. The glass bulbs on the ends of capillary tubes (*left*) are first inverted, filled with adsorbent samples, and then sealed off at the ends. Adsorbed gases are next removed from the samples by heating in a furnace (*centre*) under a high vacuum. The bulbs are then placed in a cooling medium (*right*) and a known quantity of gas, such as nitrogen, is admitted through the capillaries. From measurements of the pressure and volume of the gas before and after admission, the surface area available for adsorption may be computed.

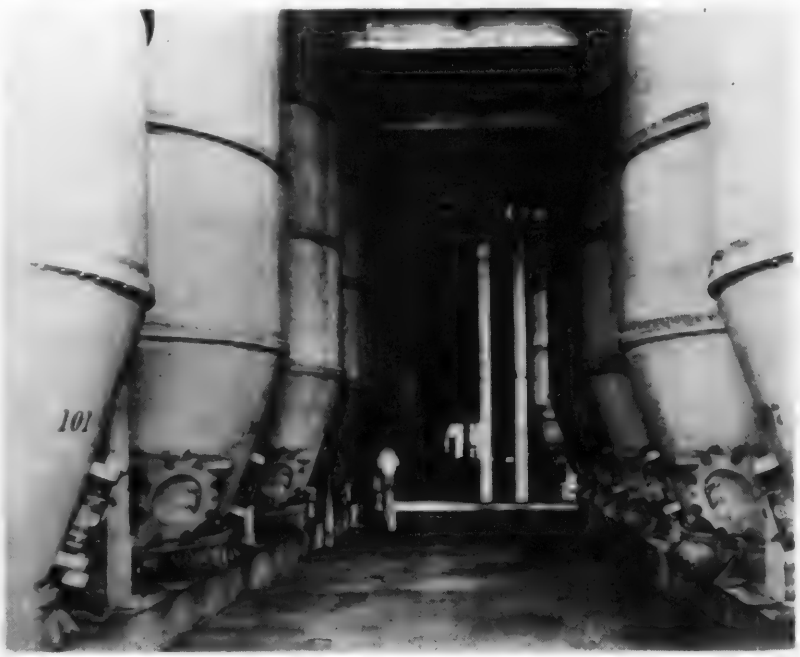
and bone char make possible plant scale experiments which supplement the laboratory work and permit evaluation of practical applications of fundamental research. While research which cannot conveniently be undertaken by any one of the co-operating sponsors is still conducted in the laboratories of the Bureau, problems requiring plant facilities for their solution are now studied in a number of individual refineries.

Structure of Bone Char

One primary objective in this research has been the attainment of an understanding of the fundamental structure of bone char. This knowledge is essential to a study of the reactions which determine the general efficiency of the revivification step. Complete information on the structure of the revivified char delivered to the filter and that of the exhausted char after filtration will make it possible to specify just what the revivification process should accomplish and to suggest logical steps for improvement.

The structure of bone char has been investigated at the Bureau by means of X-ray diffraction spectra; electron micrographs; density determinations; measurements of surface area available to known gases; chemical analysis; and studies of specific heats, heats of wetting, and heats of combustion. It has been found that the primary structure of the char consists of microscopic crystals of a complex hydroxy-apatite crystal lattice. Superimposed on this is a secondary microstructure derived from the original cellular composition of bone. The tiny units of the hydroxy-apatite crystals have been slowly deposited during growth in an intricate arrangement. The bone matrix, blood capillaries, and the associated bone-forming cells are also intimately interconnected and thus produce a very porous structure on charring.

The adsorbing properties of solid adsorbents in general depend firstly upon variations in the extent of available surface and secondly upon effects due to the specific chemical reactivity of the surface. When this project was begun, a new method had just been proposed to determine the surface area of finely divided and porous materials on the basis of the adsorption of nitrogen gas at the temperature of boiling nitrogen (77°K.) or of boiling oxygen (90°K.). As a result of measurements of a number of samples at the Bureau, it was possible to assign values to the surface areas of bone chars relative to each



Between 40 and 50 tons of bone char are contained in each of these large filters through which raw sugar liquors are passed for decolorisation and removal of impurities.

Courtesy California and Hawaiian Sugar Refining Corporation.

other with an accuracy of approximately 5 per cent.

Later studies of the adsorption of nine other gases at various temperatures yielded dependable values for the surface areas which are available to each gas.

On the basis of these data, it was first shown that new bone char has a surface area of about 130 square metres per gram or 2¼ square miles per hundred pounds. Service and spent chars were then shown to have smaller areas, which decrease as the ability of the chars to decolorise raw sugar solutions diminishes.

Specific Chemical Activity

Specific chemical activity at the surface may take the form of reversible or irreversible chemisorption, a catalytic surface oxidation, or an ionic exchange. A catalytic surface oxidation may immediately follow the physical adsorption, yielding products which in some cases may be even more tenaciously held. The evaluation of specific chemical reactivity has been a difficult task; the most promising methods of attack in the case of carbon adsorbents are based on studies of the reaction of the adsorbent with oxygen and the decolorisation reactions in raw sugar liquors at various temperatures.

From what has been learned thus far, it is possible to understand the effects of excessive heat treatment in decreasing the adsorptive properties of bone char. In the original bone the crystal unit is extremely small. However, crystal size increases with heating, and the higher the temperature of heating the more rapid is the rate of crystal growth. The effect is aggravated by the gradual accumulation of salts insoluble in the wash waters. These enter into the structure of the crystals, increasing their size, and the subsequent heating develops a more elaborate crystalline aggregate. With the corresponding reduction in porosity of the granules, the available adsorptive surface decreases. Obviously, extreme temperatures in revivification must be avoided if the desirable porosity of the bone char is to be retained. In the present conventional kiln

The large quantities of bone char used in refining sugar must undergo revivification after each use. The operator is removing used char from one of the large filters through which the sugar liquor has passed.

Courtesy California and Hawaiian Sugar Refining Corporation.

treatment only the outside shell of char in the retort may be exposed to a dangerously high temperature, but in hundreds of passages through the kiln the probability of exposure of all the char is great.

One of the outstanding characteristic changes in bone char with use is its increase in bulk density. Although new char averages only about 40 pounds per cubic foot, spent char may attain a density of 85 pounds per cubic foot. An investigation in the earlier days of the programme showed that the increase in bulk with service was not matched by an appreciable increase in true density as determined from the displacement of a known volume of helium by the char. This demonstrated that shrinkage of bone char did not occur, but that the porous structure within each particle filled up, increasing the weight per unit of bulk volume and decreasing the surface available for adsorption.

Some success has been achieved at the Bureau in relating the density of bone char to its ultimate structure. In addition, the accumulated data indicate a rough proportionality between bulk density and several adsorptive properties. This relationship may form the basis of a practical method of testing chars and will, it is believed, provide a rational criterion upon which service char may safely be discarded.

The Production and Bacteriology of Whalemeat

SINCE 1939, when interest in whalemeat for human consumption was first seriously aroused in Britain, a great deal of research work has been done on the problems involved in bringing it to the consumer in good condition.

The information contained in two recently published reports,* which review this work and summarise the present-day position, is based on research done on factory ships operating in the Antarctic, at a whaling station in Norway, and in the F.I.O. laboratories.

Slaughtering Practice

The first report contains a survey of the whaling industry and the methods used in slaughtering and the handling of the carcasses. These are almost entirely contrary to good slaughtering practice, the whales being caught for oil and not for meat. The main drawback is that the long interval between the death of the animal and the removal of the meat from the carcass allows bacterial decomposition to take place and renders a good deal of it unfit for human consumption. If the whaling ships were to be fitted with the necessary refrigeration and storage space, it is estimated that each Antarctic factory ship could produce on the average about 3,000 to 4,000 tons of meat a year. The production from the whole Antarctic industry would be between 57,000 and 76,000 tons each year.

In the procedure followed on two British factory ships, the large masses of meat weighing several tons were cut into pieces weighing 5-15 lb., pressed into metal moulds, and frozen to form composite blocks of 40-100 lb. each. The blocks were stored at −10°C. (14°F.). As the fat of the meat is similar in composition to fish oils generally, it is easily oxidised, and the meat develops rancid taints more quickly and needs greater care during storage than do beef, mutton, and pork.

Unless precautions are taken, the surface of the meat becomes dehydrated during storage in the frozen state, resulting in the rapid development of rancid taints. Both dehydration of the surface and oxidation of the fat can be prevented by covering the surface with a thin, continuous glaze of ice and protecting it with a wrap of material resistant to the passage of water vapour. By this means, whalemeat can be stored without noticeable deterioration for 10 months or longer at −10°C.

The rate of oxidation of the fat can also be greatly reduced by adding to the meat a small proportion of an antioxidant.

Bacterial Contamination

The types and numbers of bacteria found in the flesh of the whale at the various stages of the above processes are described in the second report. Two main groups of bacteria are recognised, those present from the outset throughout the carcass of the whale and those which reach the meat during dressing and handling. The distinction is important because the measures needed to deal with these two groups of microbes are quite different.

The bacteria within the carcass of the whale present unusual problems Because of the way the whale is killed, they greatly outnumber those present in ordinary meat animals and because the vast bulk of the animal cools so slowly after death, they are usually able to multiply considerably before the meat is removed and frozen for storage. With present methods of catching whales, little can be done to reduce the numbers of bacteria initially, although two measures can be taken to limit their subsequent multiplication.

The first is to reduce to the minimum the time between the death of the whale and the freezing of the meat. The second is to bleed the carcass and slit the belly wall as soon as possible after death. For some time it has been standard practice in Norway both to bleed the carcass and to slit it so that while it is being towed to the receiving point the cold sea water circulates in the abdominal cavity and cools the intestines and the tissues next to them.

Hygienic Methods

The contamination of the meat during dressing and handling can be largely eliminated by proper attention to hygiene, although the confined space on a whaling factory ship and the nature of the operations make it difficult to maintain standards comparable with the best practice on land.

Experience has shown that the first essential is to set aside a special deck for handling the meat which is transferred there from the carcass in large pieces of several tons weight, by means of a crane. The meat deck is divided into two halves, one half for receiving, the other half for cutting up the meat. The meat is thoroughly flushed with sterilised water while being handled by the crane, and also during cutting up and when stacked to await further processing in the freezing plant. The cutting up area is fitted with a continuous spray of chlorinated water which flushes away blood, scraps of meat, and bacteria. The whole of the meat plant and the cutting up deck are thoroughly scrubbed at frequent intervals with a mixture of chlorinated water and a synthetic detergent.

By the continued application of these precautions, the number of bacteria on the meat has been reduced to a level which is comparable with that obtained in good slaughterhouse practice on land.

When the meat is frozen, most of the bacteria remaining on it are killed, as with other meats, and at this stage bacteriological quality is equivalent to that of normal frozen meat. However, bacterial decomposition begins again rapidly as soon as the meat is thawed.

* *Whalemeat: Production and Preservation*. By J. G. Sharp, M.A., Ph.D., and B. B. Marsh, M.Sc., Ph.D. Pp. 47 + vi. Published for the D.S.I.R. by H.M.S.O. Price 2s. 6d. net.

Whalemeat: Bacteriology and Hygiene. By R. H. M. Robinson, M.A., M.R.C.S., L.R.C.P., M. Ingram, M.A., Ph.D., R. A. M. Case, Ph.D., M.A., Ch.B., M.R.C.S., L.R.C.P., and J. G. Benstead, M.A., M.D., M.B., Ch.B., with appendix by H. E. Daniels, M.A., Ph.D. Pp. 54 + vi. Published for the D.S.I.R. by H.M.S.O. Price 2s. net

News from the Industry

FORTHCOMING EVENTS

Scientific Film Association

The seventh congress of the International Scientific Film Association is to be held from September 18 to September 27 in the National Film Theatre and Royal Festival Hall.

During the congress there will be meetings of the General Assembly of the International Scientific Film Association and of the Permanent Committees dealing with medical, research, technical, and industrial films. There will also be the usual festival of scientific films.

*

The Nutrition Society

The 82nd meeting of The Nutrition Society will be held on Tuesday, July 28, 1953, at the National Institute for Research in Dairying, Shinfield, near Reading, Berks, and will be for the presentation of original papers and demonstrations. The chairman will be Professor H. D. Kay, C.B.E., F.R.S.

The meeting will start at 11.15 a.m. and members will have the opportunity of touring the Institute and seeing something of the research work in progress.

Further particulars may be obtained from the Programmes Secretary, Dr. R. J. L. Allen, Monkhouse and Glasscock Ltd., Snowsfields, London, S.E.1.

Office Equipment

A range of equipment covering almost every aspect of business control and management, was shown by Block and Anderson at the recent Business Efficiency Exhibition. This included the Banda 90 series spirit duplicators, using neither ink, stencils nor gelatine, producing from 3 to 300 perfect copies of all written, drawn or typed work, in as many as seven colours at the one operation, and the Bandarette, the small addressing duplicator for all short run, small area copying.

Among other machines on show was a complete range of calculators and adding machines, among which were several new models incorporating improved and additional features.

Fluorescent Lamps Cheaper

The price of the instant-self-start fluorescent lamps 40 watts 4 ft. made by Philips Electrical has been reduced from 14s. 9d. to 13s. 3d.; purchase tax is now 2s. 3d., making the total price 15s. 8d., a total saving of 1s. 9d. on each lamp.

Packaging Design Competition

Details of a design competition, sponsored jointly by the British Paper Box Federation and the British Carton Association, were announced at a recent luncheon held at Kettner's. The main purposes of the competition are twofold: to provide an incentive to accelerate the progress made in British packaging design for both home and export markets, and to stimulate a general interest in packaging in paper box board generally.

Two types of pack will be eligible: (*a*) rigid boxes, rigid collapsible boxes, cylindrical boxes, and composite boxes made mainly from paper box board, and (*b*) cartons. The three classes are as follows:

1. *In Production or on Order.*—Open to members of the British Paper Box Federation and the British Carton Association, their customers, and designers. This class will be divided into three sections: (*a*) display value, protective qualities, and general suitability for use; (*b*) graphic design; and (*c*) ingenuity of construction.

2. *New Designs* (*General*).—Open to members, their customers, and outside agencies submitting entries through a member. Members are asked to encourage their employees to submit entries under their personal names. These must be submitted through, and with the approval of, the member concerned.

3. *New Designs* (*Students*).—Open to students in full-time or part-time attendance at an Art or Technical School. Entries may be submitted through a member, or direct to the Secretary of the British Paper Box Federation, who will place them before a Technical Committee in order to avoid impractical entries reaching the judges.

Judging will be carried out by a panel made up of representatives of design interests, the Advertisers' Association, retailers, box makers, carton manufacturers, and consumers. Certificates of award for first and second places and highly commended entries will be given in all classes in which a sufficiently high standard is reached. Awards to students will take the form of three cash prizes of £10, £5, and £2 10s. in each of the two main groups.

The closing date for entries is September 19, 1953. A public exhibition of the winning packs will be held in the autumn.

A Novel Water Heater

As a result of the constant demand for a small, hand-operated electrode boiler suitable for supplying hot water for space heating and domestic purposes in the workshop, store, factory and home, G.W.B. Electric Furnaces have now developed a 15 kW water heater.

The running costs are low, as has been proved by the tests carried out in a medium sized building where, over a three months' period from September to December, the consumption worked out at less than 2s. per day.

The 15 kW Autolec electrode water heater has an output of 51,000 B.T.U's. per hour for space heating, and can produce 30 gallons of water at 160° F. in 2½ hours for domestic purposes.

Temperature control is effected by a thermostat operating a contactor in the main supply. When the water exceeds the desired temperature the contactor is switched out and when the temperature drops, put back again. A room thermostat can be incorporated to override the boiler thermostat.

Autolec 15 kW electrode water heater.

OBITUARY

Mr. Leonard Broad, chairman of H. J. Packer and Co., and Carsons, on June 6.

He played an important part in trade affairs as a member of the Council of the Cocoa, Chocolate, and Confectionery Alliance and of many of its committees, notably that concerned with distribution.

A selection of some of the sculptures carved from ordinary red bricks submitted by employees of Small Electric Motors to a brick carving competition.

Standards for Polythene Tubing

Polythene was discovered in Britain in 1933 by a team of research chemists studying the effect of high pressures and temperatures on ethylene gas. When first developed on a commercial scale, it was used almost entirely for its electrical and insulating properties. More recently, its wide range of applications became apparent, and four years ago the British Plastics Federation set itself the task of getting standards established which would ensure that polythene tubing conformed to agreed specifications, thus enabling it to be used with complete confidence.

Two years ago these specifications were submitted to the B.S.I. with a view to their adoption as British Standards. The Technical Committee, consisting of representatives of Government departments, users, and manufacturers, had as its chairman Mr. N. J. Pugh, City Water Engineer of Coventry and past President of the Institution of Water Engineers, who was among the first water engineers to carry out large-scale installations of this material in domestic water supply.

The Standards now published are:

British Standard 1972: 1953—Polythene Tube for Cold Water Services.

British Standard 1973: 1953—Polythene Tube for General Purposes, including Chemical and Food Industry Uses.

Both Standards were prepared under the supervision of the B.S.I. Plastics Industry Standards Committee.

Among the advantages of polythene tubing are:

1. It does not corrode.
2. It can be produced as a continuous extrusion.
3. It can be supplied in lengths up to 500 ft. (the maximum length of steel tubing is 22 ft.).
4. Being up to eight times lighter than the equivalent size of steel tubing and up to 11 times lighter than lead, its use reduces transport and labour costs.
5. It can be coiled and is thus convenient to store and easy to handle. A 500 ft. coil of ½ in. internal diameter tubing can be slung over a man's shoulder.
6. As it can be laid by mole-plough trenching is frequently unnecessary.
7. Because of its insulating properties, water in it is less likely to freeze than in other materials and if it does freeze, the polythene tubing does not burst because of its elasticity.
8. Polythene tubing is tough and its life appears to be indefinite. It can be cut to required lengths with tools normally used for cutting wood or metal.

Water supply schemes using polythene tubing are eligible for Government grants.

APPOINTMENTS

Succeeding General Sir Ronald Adam, Bt., G.C.B., D.S.O., O.B.E., the Earl of Halsbury, F.R.I.C., F.Inst.P., has become the chairman of the National Institute of Industrial Psychology.

Lord Halsbury is the managing director of the National Research Development Corporation, a member of the Advisory Council on Scientific Research, and chairman of the Science Museum Advisory Council. His experience in industrial management has led him to stress the need for the application of scientific method to the study of the human problems of industry.

*

At the second annual general meeting of the British Pressure Gauge Manufacturers' Association, Mr. A. J. Mann of David Harcourt Ltd., was elected President for the forthcoming year, with Mr. F. H. Halestrap of Dewrance and Co. Ltd., as Vice-President.

*

At its annual general meeting, Mr. G. H. M. Rosam was elected chairman of the Institute of Packaging for the year 1953-54. At the same meeting, Mr. Alan Fraser Cowan (Standards Division, Metal Box Co.) was elected vice-chairman. Mr. R. R. Plumpton (Anglo-Overseas Transport Co.) was again appointed Hon. Treasurer.

*

At the annual general meeting, the Right Hon. Lord Percy of Newcastle, P.C., was elected President of the Royal Sanitary Institute. Lord Percy, who presided at the recent Health Congress at Hastings, has held several high offices of State including those of Parliamentary Secretary of the Ministry of Health, President of the Board of Education, and Minister-without-Portfolio.

He has been Vice-Chancellor of the University of Durham and was for many years Rector of the Newcastle Division of the University; he has also been Member of Parliament for Hastings.

*

In order to practise independently as a consultant bacteriologist and chemist, Dr. J. G. Davis is resigning his appointment as Director (Technical), Express Dairy Co., as from August 1. His London office and laboratory will be at 9, Gerrard Street, W.1 (Tel.: Gerrard 5353), and his Reading office and laboratory at 52, London Road, Reading, Berks. (Tel.: Reading 61570).

Dr. Davis is known chiefly for his work on the bacteriology and chemistry of milk and dairy products, general bacteriology, hygiene and detergents.

Dr. Davis, who is the author of several well-known books, including the *Dictionary of Dairying*, published by Leonard Hill Ltd., is President of the Society for Applied Bacteriology, General Secretary of the Society for General Microbiology, and a member of the committee of the Society of Chemical Industry, Microbiology Group. He has served on the committees of the Biochemical Society and the Society of Chemical Industry, Food Group, and is chairman of some British Standards Institution committees. He was a founder Council member and first chairman of the Editorial Board of the Society of Dairy Technology. He is examiner in dairy technology to the City and Guilds Institute and has acted as an examiner for higher degrees to a number of universities.

Poultry Processing

It has been proposed that a new poultry processing plant should be erected at Invergordon, where a large number of local farmers are co-operating in the creation of a new unit. It is planned to wet-truck, process, freeze, and ship something like 1,000 birds weekly when finally organised. Premises have been acquired for the venture, which is to be run on co-operative lines similar to those so successfully applied in the area to fruit growing and marketing.

The Uniclone dust arrester.

A Dust Arrester

The problem of collecting dust from individual machines installed at appreciable distances from each other, making impracticable the use of a composite dust exhausting plant, is met by the Uniclone dust arrester manufactured by Sturtevant Engineering Co.

The machine comprises an exhausting fan beneath which is a high-efficiency cyclone and dust bin, built as a compact unit into a cylindrical casing which, if necessary, can be mounted upon a trolley to enable the exhaust to be applied to an individual operation on a range of machines when this is of a dusty nature.

In operation, the dust laden air is drawn into the machine by the centrifugal fan of paddle blade type, fitted to the vertical shaft of an electric motor mounted on the top plate of the cylindrical casing. The dust laden air then passes into the cyclone from which the dust is deposited into the removable dust bin, enclosed by the dust tight door at base.

The fan is fitted with a scroll, and arranged to discharge through a rectangular outlet which, in accordance with the Factories Act, can be connected to a further length of piping to discharge the air exhausted to outside atmosphere.

An appreciable air volume is handled by these units which, on account of their design, can be relied upon to work continuously, without the deterioration in suction.

The design of the suction piping can be adapted to suit particular duties and machine set-ups. Four sizes are made, known as 21 in., 27 in., 30 in., and 36 in. units, the capacity ranging between 450 c.f.m. in the smallest to 1,300 c.f.m. in the largest size. Power consumption is from ¾ to 2½ h.p.

Aerosol Fog Generator

By making full use of a non-tainting insecticide harmless to human beings, spraying by Phantomyser aerosol equipment can control and destroy many winged and crawling insects associated with the food industry. Production need not cease, but care must be taken to ensure that dead or dying insects do not contaminate goods.

Phantomyser equipment is available either as a stationary unit, which can be carried from place to place, or a wheeled unit designed specially for those premises where large areas require treatment. The PD.1 model will deal with approximately 40,000 cu. ft. in an hour using a recognised pyrethrum based insecticide.

The aerosol mist produced from the generator consists of minute liquid particles (up to about ·01 mm. diameter) which are so small that they do not burst on impact with the air or solid surfaces. The mist is dry, an important factor when the non-tainting of delicate foodstuffs has to be considered.

The Phantomyser PD.1 model.

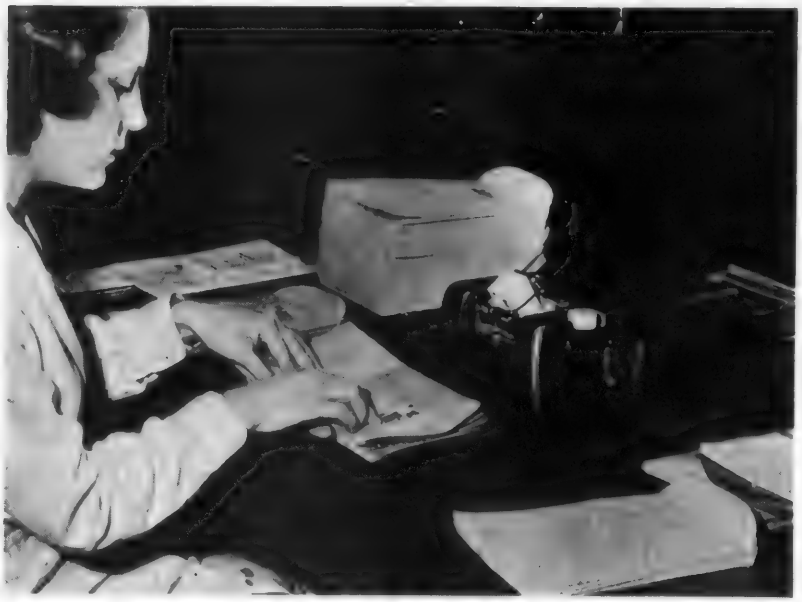
By the substitution of suitable bactericide, this model is capable of sterilising approximately 17,000 cu. ft. of air in one hour. Danger of contamination of goods from pathogenic airborne bacteria is always present in a food factory, and the use of this equipment in combating it is rapidly becoming standard practice.

New Diesel Model

The new 7 ton model powered by a 5·56 litre Diesel engine introduced by Dodge Bros. features semi-forward control and an essentially practical front end styling with the now familiar "whale back" bonnet top. A gross vehicle weight of 223 cwt. permits a generous payload and this, combined with a wheelbase of 171½ in., enables a wide variety of bodywork to be accommodated. Standard tyre equipment is 9.00-20, 12-ply, all round, but alternative tyre equipment is available on the export model.

Other features are: five-speed gearbox with close-ratio fourth speed, heavy duty frame substantially reinforced with "L" section flitch plates, large capacity springs, vacuum power assisted two-leading-shoe hydraulic brakes, full-floating hypoid rear axle with four-pinion differential, cam and double roller steering, six-point rubber mounted all-steel cab, and 24 volt electrical system.

The Dodge seven ton Diesel model.



A new automatic labeller with a speed of 30 labels per minute.

Electric Labelling

With an average speed of 30 labels of normal size per minute, the new automatic electric labeller marketed by Samuel Jones and Co. will take oblong labels from 1½ in. × ½ in. up to 3 in. × 6 in. and circular seals from 1¼ in. up to 3 in. in diameter.

Among the advantages of this equipment is the elimination of adhesive exudation round the edges of the moistened labels.

Canning Plant Demonstration

At a recent canners' demonstration day held by Mather and Platt at Manchester, a large number of pea viners and automatic pressure cookers of the latest design were seen in the course of manufacture, many of which incorporated a number of new features.

Another item of interest was the first M. and P. automatic jam filler with a rotary pump. The prototype model on view has already undergone tests in the company's factory and is about to go out on factory production tests. It consists of a special pumping unit and drive which can be fitted to the standard M. and P. filler framework and filling head. When the tests have been completed, it is intended to offer it either as a complete machine or as a replacement unit to fit on old fillers in place of the piston pumping assembly and rotary bucket valve.

Other equipment included a pump for handling peas, beans, diced vegetables, and other small solids capable of suspension in a liquid. On the suction side of the pump is a short length of Pyrex pipe coupled to the stainless steel suction hopper which is fitted with an automatic water feed control, and on the delivery side is a 4 ft. length of Pyrex pipe. It is recommended that there be a maximum ratio of solid to water of 1 : 2; up to five tons of peas per hour may be pumped through a head of 30 ft. At that duty and with a 2 : 1 ratio of water to solid, the water consumption is stated to be about 38 g.p.m.

This was one of the many machines which was working during the demonstration. It passed the peas through Pyrex glass pipework to a drainage reel, where the peas and water were separated, and then returned to the pump suction hopper.

Showroom for Process Plant

After several years at Sunbeam Road, North Acton, the process department of George Cohen Sons and Co. has now moved to Wood Lane, W.12. The department has been expanding so rapidly in recent years that it was realised last year that greater facilities would have to be found for it. Equipped with an overhead crane and with improved loading and unloading facilities, the new showroom houses a wide range of machines to interest all users of process plant.

Coding Labels

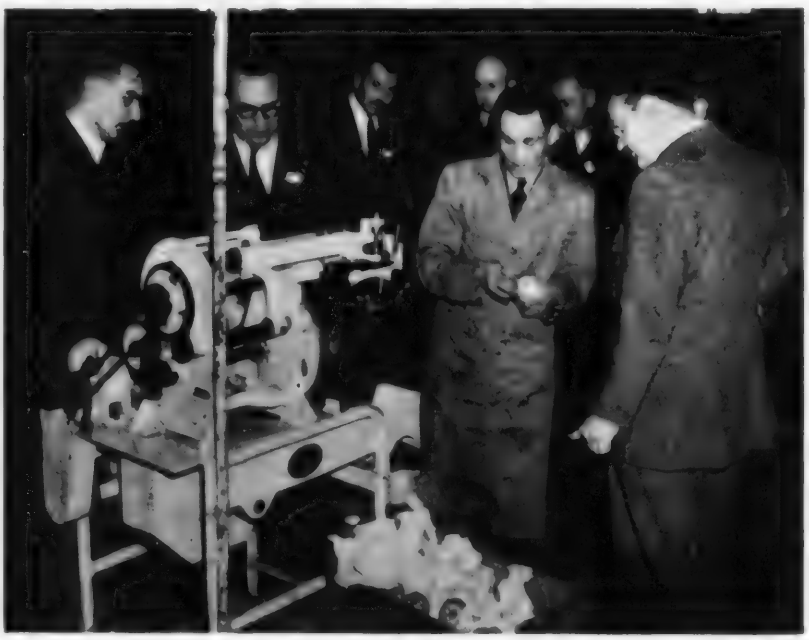
Designed to provide an easily readable date or batch number on large quantities of labels in a minimum of time, the Codedge label dating machine, manufactured by Sauven Perforating Machine Co., codes labels in complete packets.

The actual coding is effected by cutting a series of small notches in one edge of the labels, these being afterwards read by means of a simple code card.

Standard machines are constructed to code days, months, and years, but special ones can be constructed for almost any coding arrangement. Almost any shape or size of label, wrapper, or carton may be coded.

The individual saw-blades are each mounted separately in a cutting head. To vary the code, the blades may be put into or out of the operative position.

The operation is extremely rapid, giving an output of 2,000 or more labels per minute, labour costs thus being negligible.



Demonstration of an apple peeler and corer at the Mather and Platt exhibition.

Erections and Extensions

The erection of a modern fish food factory on a site at Goulton Street, Hull, is proposed by H. W. Collins and Co.

▪

Plans have been drawn up by Lazenby and Son, fish canners, to extend their factory in Hull Road, York.

▪

Plans have been submitted by Carr and Co. to carry out extensions to their bakehouse at Caldewgate, Carlisle.

▪

A new fish canning factory is to be erected on a site at Berwick by J. Van Smirren.

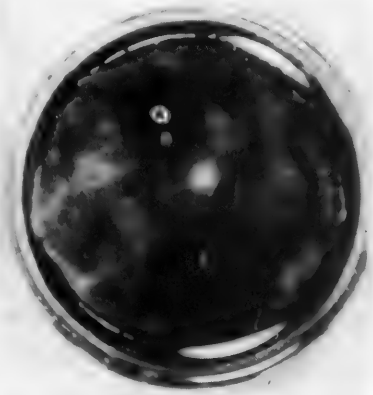
▪

Plans to open a new food processing and canning factory at Annagh, Portadown, have been prepared by Ulster Fruit Products.

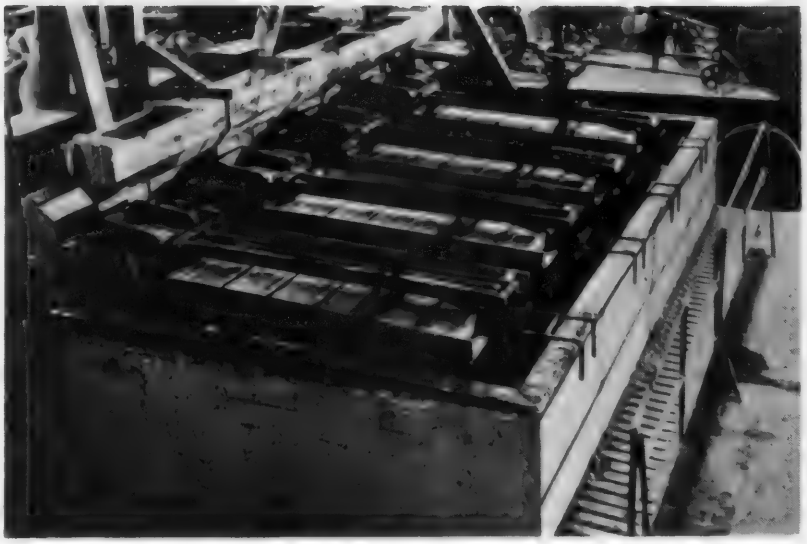
Self-sterilising Paint

A paint which is quick drying, odourless, self-sterilising while drying and when dry, self-sterilising throughout its entire life, non-poisonous, and resistant to condensation will find many applications, for example, in the decoration of walls and other surfaces in bakeries and food factories. Such a paint, Dentolite, destroys all bacteria or spores deposited on it, and if condensation should occur, this would not in any way affect the sterilising properties of the film.

At a recent Press luncheon at the Savoy Hotel, Mr. P. Edwards, chairman of Denton and Jutsum, gave full details of the paint and there ensued an interesting discussion among those present.



Tubercle Bacilli streaked on Lowenstein solution all over glass dish. Spot of white Dentolite (A) and of streptomycin solution (C) applied to dish. Pale parts of the photograph represent T.B. cultures three months old, dark parts (B and C) show sterile area created by Dentolite and streptomycin respectively.



Vibratory sieves clothed with St. Martins nylon for sifting starch.

Courtesy Corn Products Co., industrial division of Brown and Polson.

Nylon Sifting Fabrics

After 10 years of research and practical experiment jointly conducted by Courtaulds and Henry Simon, a new range of industrial sifting textiles is being marketed under the brand name, St. Martins nylon.

From experiments conducted with nylon, it has been proved to be considerably stronger than cotton, linen, wool, manilla hemp, or silk of the same dimensions and twice as strong as the same dimension of aluminium wire.

The smooth cylindrical filaments of nylon yarn minimise friction and substantially increase resistance to abrasion. The limited amount of moisture which nylon is capable of absorbing, allied to its quick drying properties, is a major asset in many industrial applications. The smoothness of the filament permits only the adherence of surface dust and dirt which can be wiped off easily. The action of many industrial chemicals, including alkalis, hydrocarbons, soap solutions, oils, and petroleum, has no effect on nylon yarns, making it a first-class fabric for chemical sifting processes.

A summary of laboratory tests provides interesting data in this respect:

1. Ten per cent. caustic soda at 185°F. for 16 hours had no effect on nylon yarn.
2. Acetic acid and formic acid in concentrations up to 3 per cent. and at temperatures up to 212°F. had practically no effect on the tenacity and elongation of nylon yarn.

In the food industry one of the outstanding advantages which nylon offers lies in the fact that it provides no sustenance to insects and is consequently free from attack by moth, silverfish, etc. It is used in a variety of operations, including the sifting of powdered and granulated food products and for soup straining.

In the flour milling industry, St. Martins nylon has been proved in practice to last at least twice as long as top quality silk employed in sifting operations.

The Measurement of Humidity

The fourth in the National Physical Laboratory's series of Notes on Applied Science, dealing with the measurement of humidity, has recently been published (H.M.S.O., price 1s.).

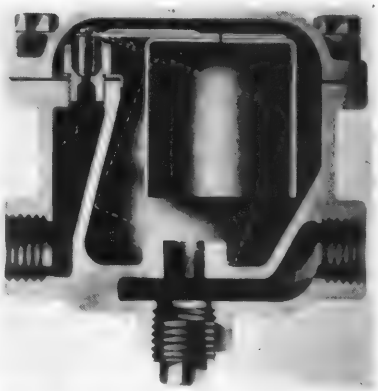
From the enquiries received by the N.P.L. about methods of measuring humidity, it is clear that there is no simple description available of these methods or of the instruments used and the problems that might arise. Written for the non-specialist, this latest publication is intended to supply this information.

Humidity has to be controlled in a great many places; tobacco warehouses, egg stores, and conditioning rooms are a few examples.

The booklet deals with the use of all the types of hygrometers likely to be needed for both precise or approximate measurements and explains the principles on which they work. It also contains instructions on their calibration, which must be carried out fairly frequently with some types.

Holiday Closure

As in previous years, Gale and Mount will again be closed for two weeks during the summer for annual holidays. The period of closure will be from July 24 to August 10, during which time no deliveries will be accepted or effected.



Newly designed inverted bucket steam trap.

Developments in Steam Traps

Newly designed steam traps in the Spirex and Ogden ranges are announced by Spirax-Sarco.

Among these is an entirely new design of inverted bucket steam trap, the bucket, bucket arm, and valve (all of stainless steel, as is the valve seat) comprising a single unit. At no point is this operating unit attached to anything; there are no pins or pivots. Nothing is attached to the cover; when it is taken off, the internal assembly can be lifted straight out in one piece. Thus, full maintenance is possible without taking the trap out of the pipeline.

Another type which has been redesigned is the open-top bucket trap.

Ball-float steam traps of extra large discharge capacity, previously supplied to special order, have now become part of the standard Spirax range. These traps are capable of handling the condensation rates which occur on starting in certain classes of process plant, yet are able to function with equal efficiency on the often light loads of condensate when the plant is up to temperature.

The company also announce reductions in prices for their thermostatic control equipment and steam trapping and air venting equipment.

Glass in Industry

As a result of the extensions totalling some 25,000 sq. ft. which have recently been completed at the Stone factory of Quickfit and Quartz, the potential output, both on the laboratory and industrial plant side, has been greatly increased.

These extensions include a new shop devoted to production of Quickfit industrial plant in glass, a new canteen, and a kitchen. Other buildings in the vicinity of the factory, including Stubbs Mill (a flour mill built in 1782) and a printing works, have been converted for use as stores and offices respectively.

The development and research department and the laboratories now occupy separate and more extensive premises. An independent unit has been established for production of special apparatus and equipment to customers' specifications. This latter department is engaged on unusual work which cannot conveniently be dealt with in routine production. The men engaged on this type of work function as a team instead of being accommodated in different sections throughout the factory.

On the welfare side, the surgery and medical facilities have been extended in relation to the increased labour intake, the department being under the supervision of a State Registered nurse.

A feature of the extended factory is the installation of equipment for electric welding of glass which greatly cuts down the time required for welding of large industrial glassware jobs.

A bay in the factory is devoted to the erection of large glass chemical plant for inspection or testing purposes, the activities of the company being increasingly concerned with the design, supply, and erection of plant for specific usage.

A barrel truck of welded tubular steel which has satisfactorily completed tests under industrial conditions.

Barrel Trucks

New equipment specially designed for transporting wooden barrels, casks, and hooped drums which are often awkward to handle with trucks of conventional pattern is made by Powell and Co.

The new truck, known as the Non-Roll barrel truck, is available in several models. The truck has two specially reinforced forks or prongs which will slide under the ends of the barrel. Since the forks may be pushed well under the barrel, the truck is easily tipped backward, lifting the barrel from the ground and cradling it in a perfectly balanced position between the wheels so that it may be moved with little effort.

One man can move a 6 cwt. barrel on a normal surface. The truck illustrated is of welded tubular steel and rugged angle and channel construction and has been thoroughly tested under actual industrial conditions. It is fitted with two cushion-tyred 16 in. diameter wheels running on roller bearings suitable for traversing rough surfaces as the ground clearance is 3 in. The weight is about 125 lb. Narrow wheelbase models are also available and a special model for beer barrels.

Visitors from Overseas

Mr. Ernest Schoenfeld, President of Schoenfeld and Sons of New York, hopes to be at the Park Lane Hotel from July 6. He will be interested in meeting manufacturers of food products who may have something that may fit into the food spice speciality line.

▪

Mr. Christopher B. Hills, managing director of the Caribbean Commercial Agency of Kingston, Jamaica, will be in Great Britain until November for the purpose of visiting friends and customers in the food, spice, and manufacturing industries. His firm is one of the leading shippers of Jamaican produce supplying most of the food industries, and imports raw materials for the processing industries in Jamaica and the other West Indian Islands.

Confectionery Exports Progress

The achievement of Mr. G. Kenneth Horner, managing director of George W. Horner Ltd., the Durham sweet manufacturers, in building up a large dollar market where none existed before was cited by the Chancellor of the Exchequer, Mr. R. A. Butler, at a recent dinner of the Institute of Export, as an example of "how to do it" in the export field.

During 1952, Horners were responsible for over 30 per cent. of the total shipments of British confectionery to 20 individual overseas markets, and over 20 per cent. of the total shipments to 30 overseas markets.

Five years ago, when Mr. Horner inherited the business, the total of the firm's exports amounted to £500 to the whole world.

Mr. Horner, who believes in personal contact with the customer and adaptability of merchandising methods to suit the customer's taste, has recognised no international barriers in his firm's effort to contribute to the export drive. In the course of his world-wide sales travels he has built up a demand for Horner's sweets in three-quarters of the world's markets.

The highest sales to individual countries are taken by five dollar markets. Of these Mexico heads the list, Cuba and Guatemala being second and third.

Instruments on Show

A wide range of equipment will be shown by the Baldwin Instrument Co. at the British Instrument Industries Exhibition. Of particular interest to food chemists will be the new Baldwin absorptiometer.

A set of eight spectrum filters in a slide is incorporated; fittings are provided for adding other filters. By adding an interference wedge filter the transmission bandwidth can be reduced and the linear range extended well beyond that attainable with the spectrum filters alone. The vacuum photocell and associated amplifier have adequate sensitivity to make up for the loss in light transmission. A beam splitter is also incorporated.

When the absorptiometer is used as a null balance instrument, with the beam splitter in the light path, the procedure is as follows: with a cell containing reference solution in the light path, the calibrated brightness control in the main beam is set to zero. The uncalibrated brightness control in the compensating beam is adjusted to obtain balance (zero reading on the moving-coil indicator). After substituting the cell with unknown solution the calibrated brightness control in the main beam is rotated to restore balance. The difference E is read off the circumference of the control dial to within 0·001. The indicator has quite fast response and adequate sensitivity to obtain accurate balance up to about E=2·000.

The beam splitter is after the condenser lens and colour filter; errors arising from the use of two separate beams with separate colour filters are thus completely eliminated.

Cross section of the light beam as it passes through the test cell is less than 8 mm. × 13 mm. The sliding cell holder can accommodate three test cells, with a maximum length of 10 cm.

Another exhibit is the N.P.L. moisture meter which has been developed in conjunction with the National Physical Laboratories for the rapid moisture determination of such hygroscopic materials as grain, seed, dehydrated foods, etc.

■

The instruments to be shown by Honeywell-Brown are designed to meet the increasing demands for closer process control which are being made by so many branches of industry. In addition to the Brown Electronik potentiometers and Protectoglo combustion safeguard systems, certain newly developed instruments will be on view. These include the new system of electronic modulating control, and the differential converter, diaphragm type pneumatic flow transmitters, and associated conventional and miniature receivers.

Among the exhibits of Cinema-Television are automatic frequency monitor (1 Mc/s), automatic voltage regulator, cathode ray tubes, industrial electronic metal detector type 3, microsecond counter chronometer, mutual and self-inductance bridge, photoelectric cells, portable metal detector, stabilised power supplies, and visual valve tester.

All the above items will be operating and demonstrations will be given through the exhibition.

■

A large graphic panel depicting a typical continuous process plant will be featured by Evershed and Vignoles. Miniature edgewise indicators and chart recorders, operated by electronic repeater transmitters, are included in the diagram at appropriate points, and knobs for setting the proportional, integral, and derivative actions of the three-term controller are also included on the actual diagram, although the controllers themselves are grouped together in a "Nested" control cubicle which can be situated in an adjacent room.

To demonstrate the method of control and to illustrate how apparatus can be conveniently tested after installation, portable plant-simulator test sets will be available on the stand.

Also displayed are the various electronic repeater transmitters, the electro-pneumatic relay or valve positioner, which is operated by the electrical signal from process controller, and various types of high duty F.H.P. motors for use with servo mechanisms.

This special H P Sauce souvenir package in the form of a carrier carton and containing three miniature bottles was sold from the company's stand at a recent exhibition at the price of 1s.

A 25th Birthday

To mark their 25th anniversary, National Adhesives held a Cocktail Party on Tuesday, May 12.

Gold watches were presented to Mr. Arthur Williams, sales director, and Mr. Tom George, factory supervisor, who have been with the company since its inception. The presentations were made by Mr. Frank Greenwall, President of the American Parent Company, who flew over specially for the occasion.

Also present were Mr. Ronald Francis (managing director), Mrs. Greenwall, Mrs. Williams, and Mrs. George.

Income Tax Relief

As soon as an employer recognises a man of uncommon ability, by paying him according to his worth, the rate of income tax and surtax to which his income becomes subject leaves a steadily diminishing number of shillings for him to spend or save from each pound he earns.

There is now, however, a favourable alternative available to a senior man and to most working directors. If he is prepared to nominate a regular annual sum as genuine savings for retirement, his firm can arrange for it to be deducted from his gross salary and thus secure, in effect, full income tax and surtax relief.

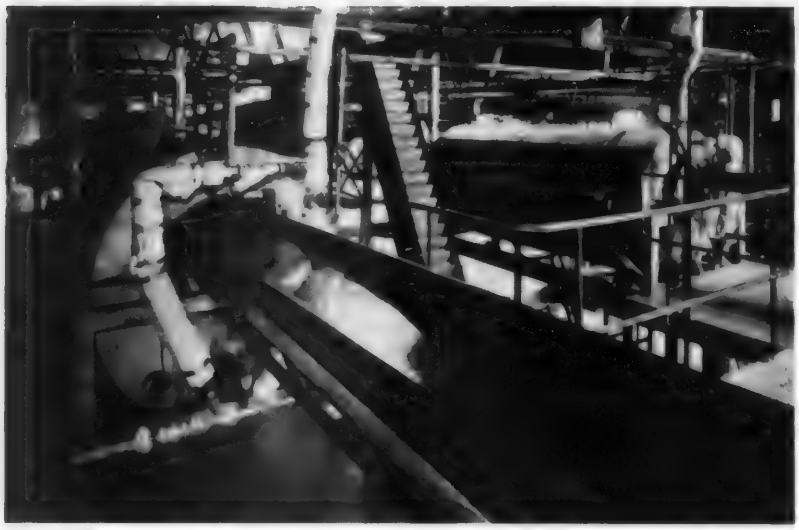
Such a scheme, within certain conditions laid down by the Inland Revenue, has been worked out by R. W. Gibbon and Son. The arrangement need not cost the firm anything, but the benefits to a man in the surtax range are obvious and substantial.

Sausage Chilling Tunnel

Plant has recently been installed at Wall's Willesden meat products factory to make possible the wrapping of sausages without normal cold store refrigeration.

A small refrigerated tunnel, adjoining the sausage filling table, chills the links which, before bundling, travel into the tunnel on a continuous conveyor. The unit, which handles about four tons of sausages daily, is cooled by brine, thermostatically controlled so that the internal temperature of the tunnel can be varied if necessary and the refrigerated air is circulated by a fan. The speed of the conveyor and of the fan are variable.

This plant, manufactured by J. and E. Hall, reduces the temperature of sausages to 50°F., so that when they emerge from the tunnel it is possible to bundle and wrap them without further refrigeration. As well as cooling them, the unit also removes all moisture from the surfaces of the sausages.



The rotary blancher operates with the Jones-Mitchell pea and bean canning line.

Rotary Blancher

Designed to operate in conjunction with the Jones-Mitchell Hydro System pea and bean canning line, the rotary blancher made by Mitchell Engineering has a capacity of up to 150 c.p.m. at four minutes blanch at 195°-200° F.

The product entering at the feed chute is conveyed by means of a specially constructed spiral through a bath of clean hot water and is then lifted through perforated buckets on to the discharge flume and conveyed on to the filler. During the lifting period and before discharging, the product is given a liberal spray of fresh clean hot water to remove scum released in the blanching process. This hot water, as well as that used for fluming at the discharge end, is allowed to flow into the base of the blancher in a continuous stream along both sides of the rotating drum on to and out through the weir type overflows situated on each side at the water level, taking with it floating scum and vegetable debris, thereby maintaining the blancher in a clean and hygienic condition throughout the process period.

The rotating drum of perforated metal is fitted with a continuous spiral mounted by means of bronze spiders on to a hollow shaft operating in self aligning ball bearing journals. The construction allows a contra flow system, the product moving forward in a continuous stream and the fresh hot water supply referred to above entering through the discharge end and moving backwards and out through the overflow. The casing is of sheet metal of robust dimensions and is split along the horizontal centre line so that its top half is left free and fitted with hinged doors along the full length, each side giving complete access for easy washing of the drum after each daily operation and facilitating maintenance inspections. All instruments, valves, fittings, feed, and discharge chutes are mounted on the bottom half and can be dismantled without removing any other parts.

A special feature is the hot wash attachment which is arranged to give the product which has passed through the blancher a final hot fresh water rinse before being discharged. Another feature is the overflow weir, which is positioned on both sides of the casing to ensure a maximum discharge of scum and floating debris through the perforations of the drum.

Pastoral on Paper

A large number of guests assembled at the invitation of Mr. P. G. Walker and directors of the Medway Corrugated Paper Co. at the Savoy Hotel on the occasion of the publication of *Pastoral on Paper*, the author of which, Mr. H. E. Bates, was present.

Pastoral on Paper is an elegant publication, its interest richly enhanced by 33 full page illustrations, devoted to Mr. Bates's picturesque description of the Great Aylesford mills of the Reed Paper Group with its mile of waterfront and its acreage as large as that of a town, in which wood is turned into paper and paper is converted into Medway corrugated cases.

In a short speech of welcome to the guests, Mr. P. G. Walker said that his organisation were great believers in using the skill and art of the author, the artist, and the photographer in keeping their customers and the public aware of their activities and products.

The object of the book was to let people know that the Medway Corrugated Paper Company formed a very important section of a larger paper organisation. In the past many friends had indicated that they were unaware that The Medway Corrugated Paper Company was part of the Reed Paper Group, and it was felt to be important to their customers, who relied to such a large extent on the products of Medway for packaging, that they should know that this company had the advantage of being associated with paper mills which were able to assure the supply of the raw material from which its products were made.

It was hoped that this book would help in publicising a much under-publicised industry. The paper trade had for many years hidden its light under a bushel, with the result that not many people were aware of the great industry that was going on in this country. In the county of Kent there was being produced more paper than in any other country in the world except Canada and the U.S.A., and there were scores of millions of pounds invested in the production of paper.

The fact that there was no scarcity of paper and paper products in the country now was largely owing to the foresight of the people who were in charge of the industry during the years prior to the war. They laid down the huge high-speed machines which were now capable of coping with the ever-growing demand for paper and board.

Finally, said Mr. Walker, if this little book enabled people to get to know his organisation a little better and dispelled some of the remoteness that so often exists between supplier and customers, they would be well satisfied. He expressed his thanks to Mr. Bates and all concerned with the production of *Pastoral on Paper*.

Central Sanitary Incinerator

The success of the G.E.C. sanitary incinerator for personal use has prompted the company to produce a larger unit for use centrally in buildings having oil fired boilers or other heating systems that preclude the burning of refuse.

The external dimensions of the new incinerator are 18 in. × 20 in. × 36 in. high, its rating is 6 kW., and it is arranged for direct connexion to the mains. A heat resisting lining and thermal insulation are provided. A double charging lid, fitted at the top of the unit, has an internal spring seal.

The temperature is controlled by means of a process timer which allows settings of up to one hour; this period has been found adequate for all purposes of drying and ignition. A hand-operated rocker hearth is fitted and there is a withdrawable ash drawer at the bottom. A 6 in. flue outlet is provided at the back of the unit.

COMPANY NEWS

In his statement presented at the 16th annual general meeting of Procea Products, Dr. D. W. Kent-Jones, chairman, mentioned that, despite difficulties during the previous year, the turnover had been increased by about 20 per cent. It was also announced that the company had acquired a suitable bakery in Birmingham which would enable them to meet the anticipated competition when flour restrictions were fully removed.

The interim dividend was limited to 2½ per cent., and a recommendation was made that the final dividend should also be 2½ per cent.

*

In his review of the year's working presented at the 33rd ordinary general meeting of Crosse and Blackwell (Holdings), Sir Sydney Parkes, C.B.E., chairman of the company, mentioned the considerable sums that had been spent in maintaining the plant and equipment at the various factories in a high state of efficiency. Particular attention had been given to the continuation of the policy of installing the most modern machinery for the various processes of manufacture, packing, and labelling.

The heavy and increasing demand for salad cream and its kindred product, mayonnaise, had made it essential for the manufacturing plant to be redesigned and streamlined so as to provide a much greater output. Likewise, attention had to be given to the provision of greater capacity for the production of Branston Pickle and Branston Sauce.

Another leading section was concerned with the manufacture of soups, particularly the range of cream soups.

These developments, aligned with the use of high-speed labelling machines and automatic cartoning equipment, had given a much increased volume of production, necessitating a speedier handling of goods inwards and outwards, which had been met by the extensive use of mechanical equipment.

As daily production increased, one of the problems had been to find sufficient storage space for even the few days during which the goods must be held for stabilisation and testing by research chemists prior to their release to the trade. Consequently, further extensions were about to be made to the principal factory in London, which would give much needed warehousing accommodation and some additional space for manufacture.

The factory at Peterhead is primarily a fish canning unit. It had an exceptionally good season in 1952, with generous supplies of fish of fine quality. During the comparatively short fishing season, fish had priority over other commodities, but on any day when there was an absence of fish, the factory was able to turn over to the manufacture of other products without loss of an hour, and so find continuous employment for workers. This is a most impressive feature of this factory, and it is a fine piece of organisation.

The directors recommended the payment of a dividend of 12½ per cent. as against 10 per cent. for the previous year, leaving an increased amount of £60,017 to be carried forward to the next account.

*

Referring to the position regarding the possibility of the return of branded margarine, Mr. J. P. Van den Bergh, chairman of Van den Berghs and Jurgens, said at the annual general meeting at Unilever House that in October, 1952, a plan was put forward by the Ministry of Food, which, after discussions between the Ministry and representatives of the industry, had been amended in several important respects. Even if in a revised form it still failed to meet all requirements, the company's Board had advised the Negotiating Committee, and through them the Ministry, that they themselves were prepared to accept such a scheme, because they were convinced that the return of branded margarine and compound cooking fat was in everybody's interests and would be welcomed by the consumers.

Thirteen years ago the company, together with all other manufacturers, willingly sank their identity, pooled their resources, removed brand names from the market, and operated a Government sponsored company to distribute margarine, cooking fat, and compound. In the belief that some measure of decontrol of margarine and cooking fat was long overdue, Mr. Van den Bergh urged the Ministry to exert every effort to overcome the remaining problems so that brands could again be on sale throughout the country, at any rate by January, 1954.

OBITER DICTA

● The second day of a diet isn't too hard—because by that time you're off it.—*Mrs. Earl Wilson, quoted in "Reader's Digest."*

● A cheese roll and a cup of tea are more nutritional than a cooked meal of mutton, cabbage, potatoes, apples, and custard.—*Ministry of Food experts, quoted in "The Star."*

● Those of us who have had to keep house abroad share our visitors' dismay at the manhandling of naked meat and bulk foods here.—*Mr. Graham Hutton, in a letter to "The Times."*

● The worker has no physiological need for meat; he can work on a diet containing comparatively little meat, the value of which is largely psychological.—*Dr. E. R. Bransby.*

● Wholesome meals do not mean a thing to the South Wales housewife, and it would seem that the tinned food habit has come to stay.—*Mr. H. T. Thomas, information officer for the Wholesale Grocers' Federation.*

● Beer of over 1070 degrees specific gravity is no ordinary brew. It is something in the beer line that nearly blows your head off. It has a number of X's that one staggers to look at. —*Mr. G. R. Mitchison, Q.C.*

● We can just recall a sausage which was a sausage and had never need to blush beneath its skin, and you could eat it even between your fingers, like you would a lollipop.—"*Hertfordshire Mercury.*"

● Buying a cup of tea in the railway buffet at Charing Cross Station, I found all the teaspoons so dirty as to be almost a danger to health. When I pointed this out, the excuse was: "Well, if we polished them, people would steal them!"—*Letter to the "Daily Herald."*

● Every mother with four children and three chocolate biscuits solves the problem by cutting up the biscuits, but the grocer, faced with only a few tins of grade I salmon and very many registered customers, has hardly this opportunity of making a Solomon's decision.—"*Halifax Weekly Courier.*"

BOOKLETS RECEIVED

The uses of chemically resistant cement are described in a new booklet produced by Semtex.

*

Feed water heating is the subject of G. and J. Weir's latest publication.

*

Some interesting aspects of how material handling can be used as part of modern manufacturing techniques are described in *The Fisholow Magazine*, published by Fisher and Ludlow.

World Food News

Jamaica to Can Tunny

A large factory for canning tunny imported from Ecuador is to be erected in Kingston, Jamaica, according to Mr. Robert Lightbourne, managing director of the local Industrial Development Corporation. Mr. Lightbourne told a meeting of island fishermen that the Government was planning a big scheme to develop home fishing, and help close Jamaica's dollar gap by replacing fish imported from Newfoundland with local catch.

The plans include the modernisation of the fishing industry and a fish breeding programme.

Vegetable Oil from Lettuce

As a result of the research carried out by James G. Macy, President of Pacific Biochemical Society, of San José, California, a plant has been constructed that will chop, press, dehydrate, and grind lettuce leaves from which, by means of a solvent, an oil is extracted which is said to be rich in xanthophyll, chlorophyll, and carotene. A dry meal residue is left which is rich in protein.

According to preliminary reports, the lettuce oil will probably be shipped east for separation from the solvent, and to be refined. The chlorophyll content is expected to find markets in the tooth paste, chewing gum, and similar fields; the carotene will go for vitamin A; and the meal by-product is expected to find an outlet in the production of animal feedingstuffs.

Chewing Gum in Ireland

A company has been formed in Ireland to make different varieties of chewing gum and their bases. The company, John O. Barker (Ireland) Ltd., with a nominal capital of £30,000, is planning to start production at once, although they will not be in full production for about six months.

The gum and bases will be supplied to the sterling area, and the new company will link up with the New York, Havana, and Paris branches of Mr. Barker's concern. Mr. Barker invented "bubble gum" in 1924.

The present factory is a temporary one. It is hoped to secure a permanent site of 20,000 sq. ft. in Dun Laoghaire for the erection of a factory. It will eventually provide employment for about 100 workers, and it will be fitted with the most modern equipment.

Two Irish firms already manufacture bubble gum and chewing gum.

Packaging Developments

An American firm has devised an emulsion containing a stable form of antioxidant which may be used to coat paper or treat paraffin wax and polythene. Food wrapped in materials treated in this way should be protected from deterioration as any oxygen either seeping in through the wrapping or originally present in the product will be absorbed.

Such a material will be particularly useful in the handling of cereals and meat products.

Italy's Food Industry

From a recent survey of the present situation of Italy's food industry made by the Food Products Industrialists' Association, it is evident that concern is being felt for the drop in output and exports of many types of food product, including tomato purée, peeled tomatoes, soup cubes, and jam.

In order to enable the Italian food manufacturers to export again in competition with foreign products, it is necessary for tinplate to be supplied at international prices, and for the canning industry as a whole to modernise plants to effect savings in costs of production and a qualitative improvement in its products.

Serious difficulties have also been encountered in the manufacture of jam. The number of manufacturing concerns has diminished from 388 in 1948 to 141 in 1952 owing to the unrestrained competition among producers, to the limited consumption, and to the heavy cost of manufacture with sugar at 40 lire per kilogram.

Camembert cheese is permitted to ripen in these special plastic containers which have been designed so as to allow air to enter the tight fitting box. This is made in moulded Styron thus providing excellent visibility of the contents.

Grain Storage in South Africa

The biggest bulk grain store in South Africa is to be built at Aspindale, near Salisbury, this year. The scheme, which will provide storage for half a million bags of grain (mainly maize, but including kaffir corn, munga, and beans), will cost about £375,000.

The store will be organised on the most up-to-date lines. All grain will be cleaned, transported, and handled mechanically. There will be an automatic temperature check on all the bins, as well as equipment to transfer the contents of one bin to another as soon as the temperature of the one rises too high. Either conventional circular concrete bins of 21 ft. diameter and 70 ft. high, or a series of rectangular bins, will be installed. If the former are adopted, it will mean that the bins will be ready to receive grain 16 months after building begins; rectangular bins, however, would not be ready before the end of 1955.

The object of the scheme is to get a carry-over of maize from one year to the next, a vast improvement on the present methods.

Food for Nothing

The United States Government is trying to give away millions of pounds of surplus butter, cheese, and dried milk which nobody wants to buy. Government-owned food, worth more than 1,000 million dollars, has piled up in refrigerated warehouses and millions more pounds of it are coming in each day.

About 90 million pounds of dried milk are being offered free to welfare agencies in Europe, North Africa, and the Middle and Far East, the recipients to pay the transportation costs. The Government wants to give away what it cannot sell to prevent the food from rotting in storage. It has become available to the Government through the price-support programme which compels the Agriculture Department to buy up all excess farm production to keep it off the market and thus ensure farmers of certain domestic price levels.

Now, the Department estimates it has enough butter in storage to supply every family in the United States for six weeks. Latest checks showed the Government owned (1) about 140,000,000 lb. of surplus butter, with new purchases running between 1,500,000 and 2,000,000 lb. a day; (2) 110,000,000 lb. of cheese, and more coming in at a rate above 1,500,000 lb. daily; and (3) 230,000,000 lb. of dried milk which is increasing by almost 3,000,000 lb. each day.

Canned Drinks

An American company is planning to sell such drinks as ginger ale and club soda in cans instead of bottles, the idea being that they will be popular with the public, who will be able to throw away the empty cans instead of having to return bottles on which they have paid a deposit. They should also be popular with the retailers, who will no longer have to bother with deposits, return bottles to producers, tie up capital in bottle supplies, or worry about breakages. The canned drinks will also take up only half the space occupied by bottled drinks.

The company uses a can made of plate stronger than that used in the canning of vegetables or beer; this has been evolved after considerable study on the effect of carbonation upon plating material. Cans are being prepared to hold either 6 oz. or 12 oz. of soft drink.

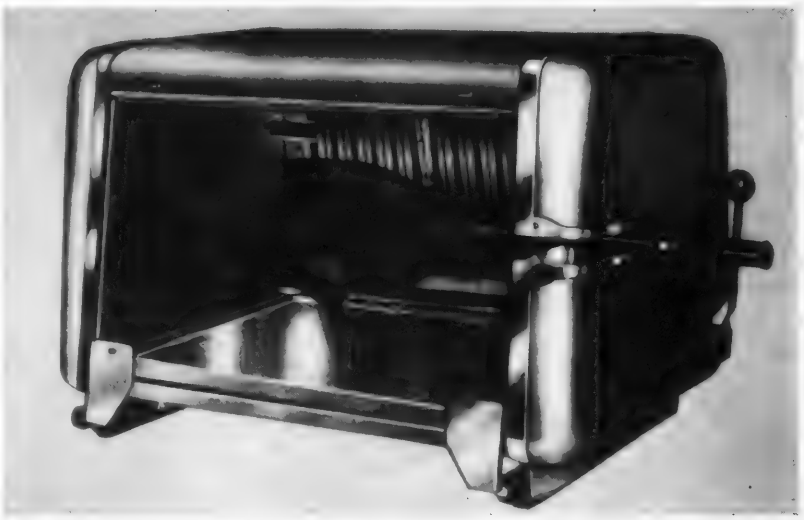
Pneumatic Duster for Bakeries

The even distribution of cornstarch over dough products by means of a pneumatic duster, is contributing to substantial savings in the bakery through dependable insect control, improved sanitation, and better quality products. Based on several years of experimental tests in two prominent American bakeries, the system is much superior to the wheat flour and dustbox sprinkling method normally employed.

By ensuring an even distribution, the pneumatic method has reduced weekly dusting material requirements to eight bags in comparison with 36 bags used in flour dusting. Adapted by the Craig Corpn., New York, from dusting equipment used to spray paper in the printing industry, the pneumatic unit is usable on dividing, rounding, overhead proofing, and moulding equipment employed in breadmaking.

In design, a typical unit consists of enclosed dusting chambers—usually with a glass window on one side—fed by a pneumatic device which powers the dust spray. A line leading from the dusting device connects with a dust chamber located adjacent to divider equipment. Two other lines lead to the top of an enclosed rounder and to a chamber enclosing a chute from the rounder to the overhead proofer. Adjustable nozzles within the dust chambers direct the application of the cornstarch. A dust collector connected to the base of the dusting chamber withdraws the excess dust by suction from the chamber, preventing its escape and flotation in the operating area of the bakery.

A large hopper affords a continual supply of the dusting material, and is adequate to meet daily processing needs without refilling.



Poultry ready for roasting in the infra-red cooking oven.

An Infra-red Cooking Oven

Among the exhibits at the recent Milan Fair was an infra-red rays oven for cooking pastry, roast meats, and similar foods, shown by the Antonello Orlandi Company of Verona. The oven is fitted with a roasting jack with an electrically driven spit, adjustable parabolic heating, and a beefsteak broiler. Meat and poultry for roasting are placed on the spit and skewered by means of two adjustable forks, the glass door sliding under the oven and the infra-red radiating element being situated in the upper position by means of a lever; this position may be altered to correspond with the size of the joints, and the heat is regulated by means of a switch.

The oven is made of stainless or enamelled steel, and has a 40 w. induction motor with a 1000/1 reduction gear, heating coils of 80-20 nickel chrome, insulating supports of steatite T.E., three-position switch, vetroflex insulation, and door of special glass with bronze roller-bearings.

The cooking times are reduced by one-half, and it is claimed that, owing to this method of cooking by radiation, meat even from a recently slaughtered animal will be tender and will not have shrunk, after being roasted in the oven.

Australian Chilled Beef for U.K.

The first cargo of chilled beef to leave Australia for 13 years is being shipped to Britain. The 10,160 ton British freighter "Jason" is to sail from Brisbane with chilled beef, worth about £12,000 on the hoof, and 1,200 tons of frozen beef, rabbits, and poultry.

The shipment of chilled beef is an experiment in the revival of the chilled beef trade, interrupted by the war.

The Olive Fly Pest

Entomologists from the Mediterranean area met in Florence, Italy, recently to discuss control of the Olive Fly.

This insect does enormous damage to the region's olive industry, reducing the crop by causing olives to drop prematurely, and impairing the quality of those which recover from its attacks. Although the fly has been known as a pest for many years, no one seems to have calculated what its attacks cost the industry as a whole, and this will be the subject of one of the meeting's first sessions, called by FAO.

Since 1943, an increasing amount of research has been carried out in various Mediterranean countries, to try and find ways of reducing the losses caused by the fly. FAO's object in calling this meeting is to enable research workers throughout the region to exchange views and information on new methods of control; to examine some of the fundamental problems that require further study; and to encourage Governments themselves so to integrate their researches that all the various aspects of the problem are adequately studied throughout the region. For example, control methods that prove satisfactory in Northern Italy may be difficult to apply in Tunisia, where conditions are very different.

A major item on the agenda, therefore, is the evaluation of old and new methods of control, including biological control whereby other parasitic insects may be used to combat the fly. Other subjects under discussion range from problems of the life history of the insect, to equipment and chemical insecticides for its destruction. A final session will be devoted to discussing the co-ordination of research activities.

Canteen Dinners

Pre-cooked and quick frozen canteen dinners are now being served in a great many American factories. The demand arose when a number of trade unions insisted that food be supplied when overtime was being worked. While all large industrial plants have their own, well-equipped canteens, many small factories are unable to offer such facilities. For these, the Frigi-Dinner Company supplies the freezer and oven. Pre-cooked meals are supplied daily at a cost of about 6s. 6d., the menu ranging from stewed meat to sea food.

The company hopes to expand its service to include homes; how far this may affect home cooking it is difficult to tell. The experiment is now being tried in Philadelphia.

Italy's New Food Packaging Centre

In the presence of numerous representatives of the Italian food packaging and preserving industries, the Institute of Food Packaging was inaugurated in Parma last March. The promoter of the Institute, Comm. Zanlari, who presided over the opening meeting, declared that the centre was the only one of its kind existing in Italy.

Parma, chosen as the seat of the new organisation, is in the centre of a region in which there are many packaging concerns; there is in the town an experimental station, equipped with the State's scientific and technical laboratories which deal specifically with the wrapping and handling of food.

Australian Meat for Britain

Britain is hoping to get 170,000 tons of Australian meat this year, according to a British Food Ministry mission at present negotiating the new contract at Melbourne. The Under-Secretary, Mr. Roscoe Herbert, said this would be "a heartening recovery" towards the pre-war total of 210,000 tons. Last year Australia sent Britain only 35,000 tons.

Mr. Herbert said it was hoped to carry current negotiations to a point that would make it unnecessary for Australia to send a delegation to London. The basis for the talks would be the latest production costs. It was Britain's aim to abolish meat rationing and return to a trader-to-trader basis. This was not possible until Britain had enough meat to satisfy her reasonable demands.

Britain and Australia ought to consider problems which might arise if decontrol comes. Under free trade the Governments of both countries would uphold their guarantees of a floor price to producers even if it meant a lump sum payment at the end of each season.

One hundred pounds of pressure is generated in 90 seconds with the steam cleaner.

New Steam Cleaner

A new vapour steam cleaner for wide and diversified use in a number of different industries has been developed by the Aeroil Products Company of New Jersey, and is now being offered to the export trade by Mercator Corporation of Pennsylvania.

It is expected that the cleaner will find ready application in hospitals for sanitising floors and equipment; in mills for cleaning and degreasing machinery; in food processing plants and bakeries for sanitary cleaning of stoves, refrigerators, vats, dough trays, etc.; and in stockyards and on farms for keeping livestock pens in vermin-free condition, and for sterilising feed troughs, incubators, milk cans, and other utensils.

A wide variety of chemicals may be used without the need for any premixing. One hundred pounds of pressure is generated in 90 seconds. The cleaner is equipped with a ½ h.p. motor and has a capacity of 120 gallons per hour and a 75-110 lb. working pressure.

OVERSEAS ENQUIRIES

Bakery Machinery

C. P. Stephenson Ltd., P.O. Box 241, Kingston, Jamaica, requires information concerning United Kingdom firms desiring representation for bakery machinery and equipment. It is understood that the Kingston firm already hold an agency for bread slicing and wrapping machines, dough greasing machines, and bread moulding machines, and would be interested in acting as agents for United Kingdom manufacturers of dough breaks and dough dividers.

United Kingdom manufacturers who are interested in this enquiry should send full details of their equipment direct to C. P. Stephenson Ltd. at the above address.

Agency for Biscuits

F. and J. M. Carrera Inc., 452, Comercio Street, San Juan, Puerto Rico, and Fernando C. Pujals and Brothers, Inc., 808, Figueroa Street, Santurce, Puerto Rico, are desirous of securing the representation of United Kingdom manufacturers of fine biscuits.

Firms interested in this enquiry should communicate direct by air mail with the companies concerned.

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Chocolate Bars and Confectionery

Mr. Paul Weisman of A. Wiesman and Co., 24, Glenwood Avenue, Minneapolis, Minnesota, would like to receive brochures, samples, etc., from United Kingdom firms manufacturing chocolate bars or confectionery specialities to retail at 5 or 10 cents per bar, and also from firms manufacturing confectionery that could be landed at St. Paul, Minneapolis, at 20 cents or under per pound. These products could be of any type, and it is immaterial whether or not they are packed in special cartons or containers. However, if packed, samples of the packaging materials should also be sent.

United Kingdom manufacturers who are interested in this enquiry should communicate direct, by air mail, with Mr. Paul Weisman.

All foodstuffs destined for the United States are subject to the United States Food and Drugs Administration Regulations.

Central American Coffee

Coffee from Central America has recently been imported into this country and can now be bought through several retailers. This coffee comes from Peru, the only Central American country from which the trade can import under the present Board of Trade licensing arrangements. Although this was not a popular coffee in this country before the war, the greatest preference being for Colombian and Costa Rica coffees, its import is nevertheless a step in the right direction, and it is a useful coffee providing some attraction to the connoisseur.

Peru is quite a large coffee producer, estimated production being well over 100,000 bags of 60 kilos, and although coffee requires several years to begin production, it is becoming popular as a replacement for the local banana crop which has been depleted by disease. Exports of Peruvian coffee are prohibited unless there is a surplus over local demands, which rise to about 70,000 bags annually. Exports of coffee from Peru in 1951 amounted to 36,700 bags, most of this going to the United States. Europe took approximately 7,000 bags, the remainder going to the Middle East and to Canada.

News from the Ministries

APPOINTMENTS

Mr. Frank Samuel, a Vice-President of the United Synagogue, has been appointed by the Minister of Food to be his Honorary Adviser on Jewish food questions in succession to the late Sir Robert Waley-Cohen.

Mr. Samuel is a director of Unilever and Unilever N.Y., and deputy chairman of the United Africa Company.

Revocation of Records Order

The Confectionery Records Order, 1953, as amended, which has required manufacturers of chocolate and sugar confectionery to furnish returns of production and stocks to the Ministry of Food, has been revoked as from May 31, 1953.

Some Cheese De-rationed

Home-produced processed cheese ceased to be part of the cheese ration on May 17, 1953, and may now be manufactured and sold free from control.

Accordingly, manufacturers in the United Kingdom may manufacture processed cheese without holding a licence from the Ministry of Food and may use in its manufacture any cheese of the rationed varieties that may be made available to them by the Ministry. In addition, home-produced processed cheese may be made in packs of any size and may be sold free from price control and off the ration.

Linseed and Linseed Oil

Imports at the rate of one ton of linseed oil (or three tons of linseed) for every two tons of linseed oil bought from the Ministry of Food will be allowed from July 1, 1953, and will continue until further notice.

This ratio will apply not only to future purchases from the Ministry of Food but also to purchases since September 7, 1952. For example, a firm which has bought 300 tons of linseed oil from the Ministry of Food since September 7 and has been granted an import licence for 100 tons of oil, may apply for a further licence for 50 tons.

Imports of linseed and linseed oil can be made from any source, and licences will be valid for six months from issuing date. Importers will be asked to continue submitting monthly returns giving the quantities of linseed and linseed oil imported against the licences issued.

Applications for licences should be made to the Board of Trade, through the Ministry of Food, Oils and Fats Division, London Road, Stanmore, Middlesex.

Oils and Fats

Certain minor amendments to the Oils and Fats Order, 1953, have become necessary as a result of the resumption of private imports of oleo oil, premier jus, and stearine, and of the introduction of auction sales of fat from Government slaughterhouses.

Under the amending Order, which came into force on May 31, oleo oil, premier jus, and beef and mutton stearine are free of control (apart from import licensing), and traders no longer need a permit from the Ministry of Food to buy unrendered animal fat.

More Import Quotas Announced

Quotas have now been announced by the Board of Trade for the import of apparel and various edible oils from O.E.E.C. and some other countries, for the remainder of this year.

The new quota of £700,000 for apparel represents a substantially higher rate of licensing for the goods remaining subject to restriction; the quota of £400,000 for oils represents roughly the same rate of licensing as before.

It was also announced on March 23 that the total value of the two quotas for canned fish and canned herring roes would be £500,000 for the last six months of 1953. It has now been decided that the quota for canned herring roes shall be on an annual basis at a value of £200,000 for the year ending June 30, 1954; the value of the quota for canned fish for the remainder of this year will be £400,000.

Licences will be valid from the date of issue until December 31, 1953, for apparel, edible oils, and canned fish, and until June 30, 1954, for canned herring roes.

Imports of Dried Chicory Root

The import of a limited quantity of dried chicory root will be permitted under specific licence during the period July, 1953, to June, 1954. It is expected that the total amount licensed will be approximately the same as in the previous period.

Import licences will be valid for consignments originating in and consigned from any country or territory other than: Albania, Argentina, Bolivia, Bulgaria, Canada, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian Zone), Guatemala, Haiti, Honduras, Hungary, Japan, Korea, Liberia, Mexico, Nicaragua, Panama, Persia, Philippines, Poland, Rumania, Tangier, United States of America, Union of Soviet Socialist Republics, and Venezuela.

More Milk Powder for Food Manufacturers

IMPROVED STANDARD FOR ICE CREAM

Because of a further improvement in supplies of milk powder, the Minister of Food, Major the Rt. Hon. Gwilym Lloyd-George, M.P., has decided to increase as from July 1, 1953, the allocations of full cream and skim milk powder to those food manufacturing industries whose supplies have had to be restricted since the beginning of 1952. The food manufacturing industries concerned include chocolate and sugar confectionery, bakery, invalid foods, soup, and ice cream. For ice cream the increased rate of allocation operated from June 1, 1953, instead of from July 1.

The increases will, in general, bring the rate of allocation of full cream milk powder for the second half of 1953 up to 150 per cent. of manufacturers' purchases in 1951, and the rate of allocation of skim milk powder for the same period up to 100 per cent. of purchases in 1951, when supplies of both products were freely available.

This improvement in supplies of milk powder for ice cream has enabled the Minister of Food to restore as from June 1, 1953, the standard for ice cream which was in force before July 7, 1952. This means that from June 1 the minimum fat content of ice cream will be increased from four per cent. to five per cent. and the minimum non-fat milk solids content from five per cent. to seven and a half per cent. The minimum sugar content, which was not reduced on July 7, 1952, will remain at 10 per cent.

For ice cream containing fruit, fruit pulp, or fruit purée, there will be a consequential increase from six per cent. to seven and a half per cent. in the fat content, and from 21 per cent. to 25 per cent. in the total content of fat, sugar, and non-fat milk solids. Similarly, the fat content of "Parev" (Kosher) ice will be increased from eight per cent. to 10 per cent.

Information and Advice

This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Toffee Lollipops

B.6554. *We should be grateful if you could supply us with a method for making toffee lollipops.* (Northumberland)

The following formula may be used as a basis for trial:

	lb.	oz.
Brown sugar	50	
Glucose	40	
Hard fat	10	
Salt		4
Butter flavour		2
Lecithin		½

The fat is pre-melted, and placed in a steam pan, to which the sugar and glucose are added with half a gallon of water. The heat is turned on, and the batch stirred to dissolve the sugar. The salt is added while boiling is continued until a temperature of 270°F. is reached. The heat is then turned off, and lecithin added to the batch, stirring briskly to bring about a state of emulsification. After the addition of the butter flavour, the batch is poured on to the cooling tables, and when firm enough to handle, is passed through a lollipop machine, which automatically inserts the sticks into each lollipop. Ten lb. condensed milk may be added to the formula if the taste of real toffee is desired.

Pectin Jellies

B.6570. *I should like some information on the production of pectin jellies.* (Yorks.)

Pectin jellies are formed as the result of the application of heat to a mixture of suitable proportions of sugar, acid, and pectin. The jellying power of a pectin extract is directly related to the original degree of methoxylation of the pectin and the preservation of its initial constitution throughout the hydrolysing process.

Although it is not possible to give a recipe for pectin jellies which will be applicable in all cases, the following proportions will generally suffice to provide a jelly:

	Parts
Water	40
Sucrose	58
Pectin extract	17

The mixture should be boiled down to a final volume of 100 parts. If the pectin extract has been obtained by pure water extraction, acid must naturally be introduced into the jelly mixture. Firm jellies can be produced with 0·5 to 1·0 per cent. of pectin in the final product. An average analysis for such a product will show the presence of 60 per cent. of sugar and 1·0 per cent. of pectin, and a *p*H value of 3·0. If tartaric acid is used, the acidity of the jelly will vary between 0·5 to 1·0 per cent.

Jellies are made by boiling the pectin material with water and then adding the sugar and acid constituents. A well-made jelly should be firm and when cut with a knife the edges should remain well defined and should not run; there should be no sign of "weeping" on the surface; should the jelly possess a lumpy consistency or the surface be hard and wrinkled, too much pectin has been used.

Biscuits

B.6565. *Please supply a formula for biscuits of a good quality.* (Ireland)

The following recipe is given as a basis for trial:

	lb.	oz.
Biscuit flour	140	
Cornflower	7	
Pulverised sugar	45	
Margarine	14	
Compound fat	32	12
Glucose	2	8
Syrup	2	8
Salt	1	4
Milk powder	2	
Bicarbonate of soda		8
Ammonium carbonate		6
Tartaric acid		2
Egg colour		10
Vanilla essence		6
Butter flavour		2
Caramel essence		½
Water (stamp)	18	12
Water (rotary)	10	

Two quantities of water are given; the first is for bakers using this dough for sheeting through rollers, and hand cutting the biscuits; the second is for bakers with a biscuit machine who will pass the dough through a rotary machine which cuts out the biscuits automatically.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.6530. *Manufacture of starch.* (India)
B.6531. *Glacé cherry packing equipment.* (London)
B.6532. *Sausage linking equipment.* (Lancs.)
B.6535. *Edible dried blood.* (Yorks.)
B.6537. *Soy albumen and edible casein.* (Sussex)
B.6538. *Metal strip door mats.* (Yorks.)
B.6540. *Sorbitol.* (France)
B.6541. *Jellied eels and crab meat canning.* (Lancs.)
B.6542. *Breakfast cereals.* (Bucks.)
B.6543. *Vegetable ghee.* (Holland)
B.6545. *Cake and biscuit manufacture.* (India)
B.6546. *Banana flour.* (Warwicks.)
B.6547. *Turkey suppliers.* (Wilts.)
B.6549. *Plastic containers.* (Lancs.)
B.6551. *Wheat germ and edible casein.* (Hants.)
B.6552. *Potato straws.* (Lancs.)
B.6553. *Cheese powder.* (Southern Rhodesia)
B.6555. *Debittered soya.* (Lancs.)
B.6556. *Hydrogen swells in canned fruits.* (India)
B.6557. *Liquorice straws and tubes.* (Durham)
B.6558. *Brining of pork.* (Yorks.)
B.6559. *Filtration of syrups.* (Inverness)
B.6560. *Mayonnaise.* (London)
B.6561. *Labellers for round cans.* (Ireland)
B.6562. *Water meter.* (Ireland)
B.6563. *Plasma.* (Lancs.)
B.6564. *Chicken in glass and raspberry canning.* (Aberdeen)

Recent Patents

691,266. INSTITUT DE RECHERCHES POUR LES HUILES DE PALME ET OLEAGINEUX: Method of recovering palm oil.
691,271. GORDING, R.: Method of improving the flavour of dehydrated whale meat.
691,682. OESTERLE, R.: Preservation of vegetable products.
691,725. RANSOMES, SIMS AND JEFFERIES, LTD., and FRANCIS, H. O.: Chaff separating sieves.
691,750. MOLINS MACHINE CO., LTD., and JACKSON, D. R. P.: Wrapping or packing machines.
691,782. CHIVERS AND SONS, LTD.: Manufacture of tablet jellies.
691,801. VICARS, LTD., T. and T.: Electrical heating of baking ovens.
691,845. GERMINAL SOC. ANON.: Process for the manufacture of coffee extracts in the form of soluble powder.
691,867. SIZER, A. W.: Machines for moulding plastic substances, for example, meals or meal mixtures.
691,878. FORGROVE MACHINERY CO., LTD., and HARRIS, R. A.: Apparatus for cutting pieces from a rope of toffee or like material.
691,889. RASMUSSON, M. B.: Apparatus for treating frozen confections and the like.
691,918. BREDT, G., LANGEN, E. G. VON, and LIESSL, O. VON (trading as PFEIFER AND LANGEN KOLN): Method and apparatus for extracting sugar from sugar beet.
691,924. LEVER BROS. AND UNILEVER, LTD.: Process for recovering carotene from carotene-containing oils and derivatives thereof.
691,943. DICKINSON AND CO., LTD., J.: Method of and means for producing machine-made tubular bags.
691,975. LACTAGOL, LTD.: Cleaning device for containers for food and the like.
692,055. BENCKISER GES., J. A., and SCHULZ, M. E.: Manufacture of natural cheese with an edible rind.
692,101. CANADIAN PATENTS AND DEVELOPMENT, LTD.: Treatment of fish livers.
692,162. GLAXO LABORATORIES, LTD.: Preparation of vitamin A and related substances.

Abstracts of Recent Specifications

Fish Washing Apparatus

This invention relates to the washing of fish and has for its object to provide apparatus for washing and transporting fish, which is especially useful on a fishing vessel for use while at sea.

An open top tank is provided with two or more nozzles for the supply of water thereto and has one wall, or a part thereof, of reduced height with a conveyor placed with its one end adjacent the top of the reduced height wall, or part thereof, so that when in use water supplied to the tank will swirl round therein and flow out over the reduced height wall or part thereof, whereby fish thrown into the tank will be washed by the swirling water and will float out with the discharging water on to the conveyor.

The tank has opposed walls of reduced height or opposed portions of the wall at reduced height with a conveyor placed adjacent each reduced height wall or portion so that there is a discharge of water and fish at both points.

683,874. *Walter Henry Wood.*

Manufacture of Sponge Cake

Sponge cake or like material after baking in the form of a continuous sheet or web is automatically delivered as a succession of inverted cut pieces on to a conveyor, which carries it forward for further treatment in the same direction as that of the web through the baking oven.

If desired, the sponge web may be cut into lengths and the individual pieces turned over by a mechanism adapted for the purpose, without any reversal of the direction of travel of the web, but it is preferable to carry out the inversion by causing the sponge material, before or after cutting, to pass round a reversing curve whence the cut pieces are delivered on to the forwardly carrying conveyor.

690,055. *Scribbans-Kemp, Ltd., Charles Rutland Barsby, Henry Chervaux Chaytor, William Clayton, Anthony Leonard Hendon, and Cyril Gordon Sumner.*

Cleaning Device for Food Containers

Food to be packed in containers is normally brought to a high standard of cleanliness; however, the interior of the containers themselves may contain particles of dirt, insects, and other foreign bodies. The use of a rotating brush in the containers will dislodge particles from the inner walls of the container but will not ensure their removal from the containers; dusting the interior of the container by hand may cause contamination of the container.

Cleaning equipment for containers for food or the like has been devised which comprises a hollow shaft constructed for rotation about its axis and having at one end thereof a brush head supporting brush bristle tufts at right angles to the axis of the shaft, bristle tufts substantially parallel with the axis, and between the bristle tufts disposed at right angles and parallel with respect to the axis further bristle tufts inclined to the axis to clean the seams of containers, and provided with apertures to provide through passages to the bore of the shaft, the other end of the shaft being provided with a gland for connexion to a suction device or an air blower device and permitting angular movement of the shaft about its axis relative to such device.

691,975. *Lactagol Ltd.*

Extracting Sugar from Sugar Beet

The known installation for extracting oils and fats is modified and further developed in such a manner that it can also be introduced into the sugar beet industry. The difficulties which stood in the way of the use of the known apparatus for extracting sugar beet were due to the non-uniform introduction of the sugar beet sections into the tower into which they were charged.

The input of the beet sections was also influenced by the outflow of the liquor, because the upward flow of the liquor which takes place in a direction opposite to the direction of movement of the section depended on the outflow. Finally, the air which is introduced with the liquor also has a similar effect, because the scum which is formed by it leads to stoppages both in the inlet for the sections and also in the outlet for the liquor.

These difficulties are obviated in an extremely simple manner by the apparatus of the present invention.

A completely uniform introduction of the sugar beet sections into the tower can be effected, and the further movement through the towers is also effected in a uniform manner by the worms which operate in them. Therefore, the sections are no longer carried along with the rising and enriched crude liquor. For this reason it is not now necessary to use any sieve-like devices, such as were used in the form of peripheral sieves in the known towers for the extraction of oils and fats, and must always be used for the filtration of the extraction liquor which is discharged from the towers. In such an extraction installation the crude liquor can flow away freely.

691,918. *Gustav Bredt, Eugen Gottlieb von Langen, and Ottmar von Loess.*

Cheese with an Edible Rind

A process is described whereby all kinds of natural cheese of any size can in a simple manner be homogeneously provided with an edible rind.

This is attained by converting the surface of the natural cheese into processed cheese, there being therefore no connecting of different sorts of cheese, but a continuous transition from natural cheese into processed cheese in the superficial layers. Since the superficial layer of processed cheese can be kept very thin, according to the concentration of the processing salt solutions and according to the duration of the immersion and of the heating, any bacteria present underneath the layer of processed cheese are killed during pasteurising or sterilising.

With this is associated an increase in the keeping quality of the cheese that has been superficially converted into processed cheese, and this improvement can be enhanced still further by the fact that the smooth and poreless layers of processed cheese render possible an airtight packing of the pieces of cheese, in which they can again if desired be subjected to pasteurising or sterilising.

Cheese that does not have to undergo any surface maturation may be subjected, as hereinafter described by way of example, to a process of internal maturation with a close coating with a layer of processed cheese, which results in a saving of labour and protects the cheese against maturation losses.

Instead of immersing the cheese in processing salt solutions, processing salts may be rubbed into it, or the foils in which it is to be packed may be provided on the inside surface with layers of processing salts, for instance in the form of mixtures with cheese powders, the cheese then being heated, in an airtight packing, to temperatures which will effect not only the surface processing but also a pasteurising or sterilising of the surface underneath the packing foil.

692,055. *Max Erich Schulz and Joh. A. Benckiser.*

Recent patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

Trade Marks

BESTALB.—693,288. Gluten and gelatine, all for food; and starches and gums, all in solution, paste or powder form, and being ingredients in foodstuffs. **Hiram Gopsill Tilston** and **Schachno Peisach Schotz,** trading in co-partnership, 6, Newcomen Street, London, S.E.1; Manufacturers and Merchants.

BACKIN.—702,990. Flour, cereal, preparations for food for human consumption, bread, cakes, biscuits (other than biscuits for animals), pastry, baking powder, ice cream, non-medicated confectionery, and condiments (other than condiments for cattle). **Rudolf August Oetker** and **Ursula Oetker,** trading as **Dr. August Oetker,** Lutterstrasse 14, Bielefeld, Germany; Manufacturers and Merchants.

NOVADION.—710,429. Chemical products used in industry; chemical products used in agriculture, horticulture, and forestry; and artificial manures, chemical preparations for preserving foodstuffs, and tanning substances. **Naamlooze Vennootschap Noury and Van Der Lande's Exploitatie Maatschappij** (a Joint Stock Company organised under the laws of the Kingdom of the Netherlands), 13, Brink, Deventer, Holland; Manufacturers.

"LIQUIFRY."—711,102. Fish food in liquid form. **Oswald Leonard Carrington** and **Jeffery Neville Carrington,** trading in co-partnership as **The Liquifry Company,** 7, High Street, Dorking, Surrey; Manufacturers and Merchants.

GRANNY'S FAVOURS.—712,032. Biscuits (other than biscuits for animals). **Excelsior Biscuit Company, Limited,** 50, Thomas Road, London, E.14; Manufacturers and Merchants.

VELVEEN.—713,202. Compounds of fats and oils prepared for use as ingredients in the manufacture of chocolate to prevent the formation of bloom. **Aktieselskabet Danish Milk and Cocoa Products, Limited** (a Company incorporated under the laws of Denmark), 4, Amaliegade, Copenhagen K, Denmark; Manufacturers and Merchants.

FRUIT BOWL.—713,432. Boiled sugar confectionery, chewing gum, and chocolate, all being fruit flavoured and non-medicated. **N.V. "De Faam" P. A. De Bont's Fabriek van Chocolade en Suikerwerken** (a Limited Liability Company organised and existing under the laws of the Kingdom of the Netherlands), Liniestraat, 1, Breda, Holland; Manufacturers and Merchants.

CHESSOVALE.—713,544. Poultry (other than live poultry) and eggs. **Mervyn Darvell How** and **Ronald Mervyn How,** trading as **M. D. How and Son,** Woodlands Farm, The Vale, Chesham, Buckinghamshire; Merchants.

FRYOLETS.—713,626. Cereal preparations for use as dressings for meat and fish. **Lloyd Rakusen and Sons, Limited,** 20, Meanwood Road, Leeds, 7, Yorkshire; Manufacturers.

ANCHOR.—713,706. Baking powder, raising powder (being an aerating preparation for use as an ingredient in food), blancmange powder, custard powder, cake mixtures, pudding mixtures, gravy powder, spices (other than poultry spice), and flavourings (other than essential oils). **Burdall's, Limited,** Hillsborough Works, Penistone Road, Sheffield, 6; Manufacturers and Merchants.

OPALUX.—713,760. Paper for wrapping and packaging purposes. **Bunzl Pulp and Paper, Limited,** Friendly House, 21/23, Chiswell Street, London, E.C.1; Paper Merchants.

DANISH PRINCESS.—714,028. Cheese and milk powder. **Peter Jensen Aktieselskabet** (a Company incorporated under the laws of Denmark), 8, Scandiagade, Copenhagen, S.V., Denmark; Manufacturers and Merchants.

SUNKIST.—714,337. Table jellies. **Excelsior Biscuit Company, Limited,** 50, Thomas Road, London, E.14; Manufacturers and Merchants.

GOLDEN ANGEL.—714,492. Canned fruits, fruit preserves, jams, and marmalade. **Angel Warehouse Company, Limited,** 74, Upper Street, Islington, London, N.1; Manufacturers and Merchants.

REINDEER MINTS.—714,495. Non-medicated confectionery flavoured with mint. **Co-operative Wholesale Society, Limited,** 1, Balloon Street, Manchester; Wholesale Dealers and Manufacturers.

POLYPAK.—714,576. Bags and lining material, all of flexible transparent plastics for wrapping and packaging purposes. **E. S. and A. Robinson, Limited,** 1, Redcliffe Street, Bristol, 1; Manufacturers.

WOTA.—716,502. Pallets, being articles in the nature of platforms for holding goods during storage and transportation, and being made wholly or principally of metal. **Wota, Limited,** Park Lane, Fallings Park, Wolverhampton; Manufacturers and Engineers.

New Companies

Alf. Thompson (Bury), Limited. (517090.) 14, Union Street, Bury. To carry on agencies for the purchase and sale of confectionery, chocolates, sweets, etc. Nom. cap.: £10,000 in £1 shares (2,500 cum. pref.). Permt. dirs.: A. Thompson and Mrs. C. Thompson, 10, Seedfield Road, Bury.

Claytons (St. Helens), Limited. (517122.) 57, Greenfield Road, St. Helens. To carry on business of importers and buyers and sellers of meat, etc. Nom. cap.: £1,000 in £1 shares. Permt. dirs.: A. Clayton and Mrs. V. E. Clayton, 57, Greenfield Road, St. Helens.

Delmed, Limited. (517123.) Main Street, East Ardsley, nr. Wakefield, Yorks. To carry on business of growers, importers, exporters, canners, bottlers, and processors of and dealers in frozen and other foodstuffs, etc. Nom. cap.: £200 in £1 shares. Dirs.: Hilda Quinn, Barnabyra, Main Street, East Ardsley, nr. Wakefield; H. Quinn, 151, Bradford Road, Wakefield; L. Driver, The Bungalow, Skipton Road, Silsdon, Yorks.

Quality Casings (Exporters and Importers), Limited. (517131.) 26, Main Meat Market, Stanley Abattoir, Liverpool. To carry on business of manufacturers of and dealers in sausage skins and casings, etc. Nom. cap.: £2,000 in £1 shares. Permt. dir.: S. Polak, 216, Queens Drive, Liverpool, 15.

Thomas Preston (D and C), Limited. (517218.) Carlyle Works, Aston Road North, Birmingham, 6. To take over business of tea and coffee bagmakers, printers, and paper merchants, carried on by Dobson and Crowther, Ltd., and to carry on business of manufacturers of and dealers in paper and film bags and wrappers, etc. Nom. cap.: £105,000 in £1 shares (63,508 cum. pref.). Dirs.: to be appointed by subs. Subs.: J. W. Heywood, 198, Parkhills Road, Bury, Lancs., and Sarah A. Dawson, 10, Crosby Road, Radcliffe, nr. Manchester (clks.).

H. Rubeck, Limited. (517281.) 11, Hart Street, London, E.C.3. To carry on business of manufacturers of and dealers in essential oils, essences, fluids, raw, diluted, and concentrated juices, cordials, etc. Nom. cap.: £4,000 in £1 shares. Dirs.: E. J. Rogers, 104, High Holborn, London, W.C.1, and C. W. M. Turner, 66a, Fenchurch Street, London, E.C.3.

Simfora Food Products, Limited. (517355.) Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: Jean Herbert (co. dir.) and Claire Moore (secy.), 128, Albany Street, London, N.W.1.

Parkinsons (Rochdale), Limited. (517392.) 315, Entwistle Road, Rochdale. To carry on business of manufacturers of and dealers in confectionery, chocolates, etc. Nom. cap.: £10,000 in £1 shares. Permt. dirs.: F. Taylor, Parkhills House, Bury, and D. Preston, 131, Parkhills Road, Bury.

Scribbans-Kemp (Research and Development), Limited. (517937.) Africa House, Kingsway, London, W.C.2. To act as scientific and technical advisers and research experts and developers to and for industry in all branches, particularly in connexion with the manufacture of confectionery and foodstuffs, etc. Nom. cap.: £20,000 in £1 shares. Dirs.: H. Oliver-King, 151, Grosvenor House, Park Lane, London, W.1; W. Clayton, 11, The Drive, Orpington, Kent; F. B. Martin, 53, Lake View, Cannons Park, Edgware, Middlesex.

Venz Chocolate Company (London), Limited. (517942.) 6, Hanover Square, London, W.1. Nom. cap.: £1,000 in £1 shares. Dirs.: G. A. de Vries and H. N. de Vries, Apeldoorn, Holland. Subs.: R. W. Cox, 51, District Road, Wembley, Middlesex, and R. F. Pegler, 96, Thurlestone Avenue, Morden, Surrey (clks.).

W. H. Marsh and Son, Limited. (518019.) 9, Dudley Street, Sedgley, Staffs. To carry on business of ham and bacon manufacturers and curers, etc. Nom. cap.: £9,000 in £1 shares. Permt. dirs.: T. A. Marsh, Mrs. H. W. Marsh, and W. A. Marsh, all of 34, High Holborn, Sedgley, Staffs.

A. Boake, Roberts and Company (Manufacturing), Limited. (517983.) To carry on business of chemical manufacturers, chemists, distillers, and drysalters, etc. Nom. cap.: £100 in £1 shares. Dirs.: not named. Subs.: K. F. Burtsal and A. P. Halberstam (solrs.), St. Swithins House, Walbrook, London, E.C.4.

Chlorophyll and Derivatives, Limited. (517989.) 1, Laurence Pountney Hill, London, E.C.4. Nom. cap.: £10,000 in 10,000 cum. pref. shares of 5s. and 7,500 ord. shares of £1 each. Dirs.: P. Blackman, 20, Hortus Road, London, E.4, and A. Perelmann, 28, Southway, London, N.W.11.

Sunnyside Products, Limited. (518015.) 74, Corporation Street, Manchester. To take over the business of Sunnyside Products, Limited, and to carry on business of manufacturers and dealers in flavouring and colouring essences for the manufacture of confectionery, baking, gravy, and other cooking powders, etc. Nom. cap.: £8,000 in £1 shares. Dirs.: C. S. Culf and Agnes B. Culf, Graythorne, Washway Road, Sale, Cheshire, and T. E. Milligan, Newstead, Northenden Road, Sale, Cheshire.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.